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**The Relation between Firm Value and Corporate Ownership: Evidence from China's Listed Companies**

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# **The Relation between Firm Value and Corporate Ownership**

**Evidence from China's Listed Companies**

**YUN YAO**

**A thesis submitted for the degree of Doctor of Philosophy**

**University of Bath  
Department of Economics and  
International Development**

**October 2008**

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# Abstract

In this study of China's listed companies, we apply a 2SLS fixed effects model in a simultaneous equation system to study the interaction among firm value (Tobin's Q), managerial ownership, and the largest shareholder's ownership, controlling for two sources of endogeneity: unobserved firm heterogeneity and the simultaneity problem. We find all three variables are jointly determined under a cross-sectional framework of simultaneous equation analysis. However, when taking into account unobserved firm-specific effects under a panel data framework, we find only that firm value and the largest shareholder's ownership are jointly determined, although managerial ownership still affects firm value in a linearly positive way. Firm value has positive effects on the largest shareholder's ownership, while the largest shareholder ownership is found to have an inverse-"U" shape influence on firm value. To further allow for ultimate ownership in the relation, we use cross-sectional data and find the separation between cash flow rights and voting rights is negatively related to firm value. This proves the coexistence of the incentive alignment effect (embodied by cash flow rights) and the entrenchment effect (embodied by voting rights). Finally, by using a dynamic random effect probit model to allow for unobserved firm heterogeneity, dynamic factors and endogeneity of initial conditions, we explore the occurrence mechanism of the largest shareholder's tunneling. We find that tunneling of the largest shareholder is rather persistent during sample years. Firms with longer listing histories and higher debt levels are more likely to suffer from tunneling problems. Firms located in western area of China are more likely to be tunneled by their controlling shareholders. We find government policy against such behavior becomes more and more effective. From local authorities' perspective, however, we only find an insignificant negative role for the local unemployment rate. On the other hand, local fiscal deficit has insignificantly positive relation to tunneling occurrence, reflecting the tax evasion nature of tunneling.

# Chapter 1

## Introduction

### 1.1 Research Background

Since Berle and Means (1932), it has been widely believed that well dispersed ownership is a fundamental feature of modern corporations and the source of the central conflict of interest existing between self-serving managers and shareholders. Jensen and Meckling (1976) suggest managerial shareholding as a method to mitigate management incompetence and unaccountability. However, the literature on the relation between managerial shareholding and firm value, using different samples, reaches inconclusive results. While some studies find a monotonic form of the function (Mehran 1995; Morck et al. 2000; Chen et al., 2003), various nonlinear functions were detected in others (Morck et al., 1988; McConnell and Servaes 1990; Cui and Mak, 2002). Managerial ownership generates two conflicting effects on managers' behavior: the incentive alignment effect and the entrenchment effect. The non-linear relation between managerial ownership and firm value arises because of the dynamic dominance between the interest alignment effect and the entrenchment effect through all levels of managerial ownership.

Demsetz (1983) argues that theoretically managerial ownership should be regarded as an endogenous variable that is jointly determined by firm external environment, and internal characteristics such as industry affiliation, investment opportunity, growth potential, and asymmetric information. Holderness et al. (1999), Himmelberg et al. (1999) and Demsetz and Villalonga (2001) fail to find any statistically significant effects of managerial ownership on firm value. Additionally, some researchers even find the reverse causality running from firm value to managerial ownership (Loderer and Martin, 1997; Rose, 2005).

Recent researches, on the other hand, find that a well dispersed ownership structure is relatively rare outside the U.S. and the U.K. (La Porta et al., 1999; Faccio and Lang, 2002; Franks and Mayer, 2001). Instead, concentrated corporate ownership is rather common in



both developed and developing economies. The expropriation of minority shareholders by controlling shareholders gives rise to another type of agency problem between controlling shareholders and minority shareholders. La Porta et al. (1999) claim that the current major agency problem plaguing corporate governance across the world, is how to restrict the expropriation of minority shareholders by controlling shareholders.

Johnson et al. (2000) use the word “tunneling” to generally describe controlling shareholders’ private-benefit-pursuing activities of transferring resources out of firms they control. Many empirical studies have proved the existence of the private benefits of control by demonstrating that controlling shareholders are willing to pay share trading premiums during block share trading (Hanouna et al. 2001; Dyck and Zingales, 2004) or to pay voting premiums for shares with enhanced voting rights (Chung and Kim, 1999; Nenova, 2003). Another important issue of ownership and firm value relation is the separation between cash flow rights and voting rights under ultimate controlling structures. La Porta (1999) argued that globally many large corporations are ultimately controlled by their controller through complex controlling structures, such as pyramid control, dual class shares, and cross shareholding. Accordingly, Claessens et al. (2000) claim that the separation between cash flow rights and voting rights, measured by the difference of voting rights and cash flow rights, have negative effects on firm value. Since the beginning of 1990s, China’s large SOEs have witnessed a restructuring process by carving out profit-generating assets to form state (department) and SOE controlled PLCs to raise capital in the stock markets. Liu and Sun (2005) argue that in this share issue privatization (SIP) the state has not actually relinquished its control over the majority of PLCs listed on China’s stock markets. Instead it *ultimately* dominates the markets *directly* through its departments at various levels and *indirectly* through state-owned legal persons (institutions). A pyramid controlling structure is the most pervasive ultimate controlling structure in China.

There are some issues of existing researches on the relation between corporate ownership and firm value. Firstly, the majority of these studies have just focused on either the managerial agency problem or the controlling shareholder’s expropriation agency problem, leaving the interaction between managerial ownership and controlling shareholders’ ownership unexplored. Under a concentrated corporate ownership structure,

the largest shareholder is expected to take control of the firm, and monitor managers to maximize firm value. Given that both are insiders of the firm, how the manager and the largest shareholder react to changes in each other's ownership of the firm is a fresh angle from which to study corporate ownership.

The second issue of these studies on ownership-and-firm value relation is the way they tackle the endogeneity of ownership. Most studies use OLS on pooled samples or simple panel data models to study the relation. However, these methods cannot solve the endogeneity problem that arises because of the omission of unobserved firm-specific effects and simultaneity problems between ownership variables and firm value. Simply using instrument variables (2SLS) in panel data models in a single equation framework will just mitigate the endogeneity problem in that it does not tackle simultaneity problem properly and the effectiveness of mitigation has to rely on the quality of the instruments.

## **1.2 Theme Question and Research Framework**

### **1.2.1 Theme Question of this Study**

This study provides a more consistent picture of the ownership-and-firm value relation in China's stock markets. We aim to answer the following questions. Are managerial ownership and the largest shareholder's ownership endogenous in the relation? Are firm value and the two ownership variables jointly determined? What is the relation between managerial ownership and the largest shareholder's ownership? What is the role of the largest shareholder in China's PLCs? How does tunneling happen?

### **1.2.2 Research Methods**

#### **1.2.2.1 Estimation of Ownership and Firm Value Relation**

Many standard studies (Morck et al., 1988; McConnell and Servaes, 1990) on the ownership-and-firm value relation employ a cross-sectional estimation method. However, the endogeneity of ownership variables renders the OLS estimation these studies used inconsistent. There are two main sources of the endogeneity of ownership variables. First,

the simultaneity problem exists between firm value and key ownership variables. In other words, firm value and key ownership variables might be jointly determined. Thus single equation analysis studying the causality from ownership to firm value, even with good instruments, will not properly solve the endogeneity problem of ownership variables. Second, unobserved firm-specific effects affect a firm's ownership structure. Therefore, OLS estimations of the firm value model that do not allow for unobserved firm heterogeneity will inevitably suffer from endogeneity problems. Panel data models can mitigate the endogeneity problem by taking into account unobserved firm-specific effects. As such, controlling these two sources of endogeneity of ownership variables, 2SLS applied in a simultaneous equation system using a fixed effects model is the most suitable way to more consistently estimate the relation between ownership variables and firm value.

In this study, we first use OLS to estimate the pooled sample in both single equation analysis and simultaneous equation analysis. Comparatively, panel data models are applied in both single equation and simultaneous equation analysis. Due to the availability of data on the ultimate controlling shareholders in China's stock markets, we can only manage to explore the first issue using the information on the largest shareholders who *directly* control listed firms. In terms of the ultimate controller issue, noted in the latter part of this chapter we use cross-sectional data to analyze the effects of the separation between cash flow rights and voting rights on firm value.

### **1.2.2.2 Estimation of Controlling Shareholders' Tunneling**

As far as estimation of the tunneling model is concerned, since a static binary choice model cannot capture the high persistence of tunneling behavior of controlling shareholders, we choose a dynamic binary choice model, allowing for lagged-term information on the tunneling. The unobserved persistent firm-specific heterogeneity, such as managerial skill and quality, and organization efficiency and culture, can be plausibly assumed to affect the tunneling decision of the largest shareholder, who is necessarily familiar with this insider information unobserved by outside investors. Thus theoretically a fixed effects model (linear) and a standard random effects binary choice model are expected to be more suitable than the pooled estimation methods. However, with many

firms in the sample, fixed effects models will not only lose substantial degrees of freedom, but also have to exclude some time-invariant factors of interest, such as location and industry. A standard random effects binary choice model suffers from an endogeneity problem once we include the lagged-term dependent variables, which are definitely correlated to the error term.

As such, we introduce the Mundlak-Chamberlain Random Effects Model (Mundlak, 1978; Chamberlain, 1984) to relax the assumption of independence between the individual effects and explanatory variables. This method assumes that the regression function of unobserved firm heterogeneity is linear either in all time means of time-variant variables or a combination of their lags and leads (Propper and Burchardt, 1999; Arulampalam et al., 2000; Propper, 2000). Unlike the standard (traditional) random effects model, this method allows for the correlation between the unobserved firm-specific effects and explanatory variables by introducing time means of time-variant variable(s) to control for individual effects correlated with explanatory variables. We choose the average return on assets (ROA) and the dividend ratio to represent firm heterogeneity.

By integrating a lagged dependent variable in the Mundlak-Chamberlain Random Effects Model to capture state dependence in tunneling, we form a *dynamic random effects probit model*, which has been used in empirical research (Orme, 1996; Arulampalam et al., 2000; Propper, 2000). However, the dynamic panel model suffers from this endogeneity problem called the *initial conditions problem* caused by the correlation between unobserved effects and the initial observation (Hsiao, 1986). As a result, in order to fix this endogeneity problem, following Heckman (1981a; 1981b) we use a Heckman two-step estimation method for a dynamic random effects probit model, which simplifies the estimation into two probit models: one for the model of interest and the other for the initial conditions. Taking account of the correlation between unobserved effects and explanatory variables (including the lagged dependent variable) and the correlation between unobserved effects and initial conditions (i.e. the initial conditions problem), the Heckman estimator is expected to be the most suitable method to analyze a panel data like ours that has a lot of persistence in the dependent variable.

## 1.3 Contribution and Limitations of this Study

### 1.3.1 Contribution of this Study

The contribution of this study lies in our solving of the problems and limitations of empirical studies. First, most studies on ownership-and-firm value relation in China's stock markets use cross-sectional estimation methods and do not properly deal with the endogeneity problem of ownership variables. In this study, by using a two-stage panel data method in a simultaneous equation model we control for two sources of the endogeneity problem: the unobserved firm heterogeneity and the simultaneity problem between firm value and two ownership variables. This method also gives us an opportunity to explore the interaction between firm value and ownership variables.

Second, the majority of studies are based on the misleading official classification of shareholders, which categorizes state-owned institutions or state-owned enterprises into the "legal person" category that also includes private enterprises (Liu and Sun, 2005). Basically, in terms of state and private ownership, legal person creates an ambiguous classification. As a result, studies that only focus on state *direct* ownership underestimate the influence of state ownership on firm value. To handle this issue, we manually collected identity information on the PLC's largest shareholders and divided the whole sample into state controlled firms (both directly and indirectly) and private legal person controlled firms, to distinguish their effects on firm value.

Third, it is quite common to use accounting indicators such as return on assets (ROA) and return on equity (ROE), to measure firm performance. However, this information might not reflect the actual operation and performance due to the pervasiveness of tunneling and earning management in China's stock markets. Thus in this study we use a simple version of Tobin's Q as the proxy of firm value: a widely used market value based indicator.

Fourth, few studies take into account local political factors, such as local unemployment and local fiscal condition. State ownership is predominant in China's stock markets. Due to the tradability constraints imposed on shares held by the state and legal persons, it is crucial to allow for local social and political indicators that affect authorities' decisions on transference of block shares. Uniquely, we include *city-level* unemployment ratios and

fiscal deficit information to capture the political pressure PLCs are facing. We also include this information in our tunneling model to see how the largest shareholder reacts to these political factors when making tunneling decisions. By comparing the effects of these local political factors on tunneling and those of year dummies, we can see the difference between the supervision of tunneling by local governments and that by central government in China.

Finally, existing studies on the occurrence mechanism of tunneling normally use a standard binary choice model. However, this method cannot capture the dynamic characteristics of the tunneling decision and tackle the initial condition problems. Therefore, we adopt a dynamic random effects probit model to allow for these indispensable aspects and provide more consistent estimation of tunneling occurrence.

### 1.3.2 Limitations of this Study

There are some limitations of this study. First, because there is no complete information of ultimate ownership for China's PLCs during the whole sample period, we mainly study the influence of *the largest shareholders*, instead of the *ultimate controller*, on firm value and assume these largest shareholders are the ones who making tunneling decision. For our sample period between 2001 and 2004, information of ultimate controllers of PLCs is only available for 2004. We can only use this cross-sectional data to examine how the separation between cash flow rights and voting rights affect firm value. This result can only be used as a supplementary result of the ownership and firm value relation.

Second, when calculating the simple version of Tobin's Q, we used the product of average stock price and total shares to calculate the market value of shareholders' equity. In other words, we tend to treat tradable and untradeable shares equally, although there is tradability constraints on shares held by the state and legal persons in China's stock markets.

Third, the study only focuses on PLCs in China's market, which are just a part of the whole economy. So the results might not be applicable to all enterprises in China's market and our policy insights are mainly drawn from the stock markets perspective.

## **1.4 Structure of this Thesis**

The whole thesis is organized as follows. Chapter 1 overviews the research background and produces the theme research question and research framework. In Chapter 2 we take a closer look at the existing literature on the ownership and firm value relation and tunneling by the largest shareholders. Chapter 3 provides the institutional background of China's stock markets, and the political and economic factors involved in the ownership and firm value relation and tunneling are introduced. In Chapter 4 firm value and ownership models and a tunneling model are developed and hypotheses are developed accordingly. Estimation methods, data and variables are also introduced. Chapter 5 presents empirical results for the ownership and firm value model using simultaneous equation analysis, tunneling model using dynamic random effect probit model, and a simple cross-sectional analysis of ownership-and-firm value relation and tunneling under an ultimate ownership framework. Finally, in Chapter 6 we draw conclusions and provide policy insights.

# Chapter 2

## Literature Review

### 2.1 Introduction

There has been a large stream of literature studying the impact of ownership structure on company performance. Berle and Means (1932) regarded the separation between ownership and operation under a widely dispersed ownership as a fundamental feature of the modern company. The agency problems caused by the unaccountable manager's non-profit-maximizing behavior in this separation case have been a focal topic in corporate governance studies (Williamson, 1963a, 1963b; Jensen and Meckling, 1976). Jensen and Meckling (1976) suggest management shareholding as a method to mitigate the agency problem of management entrenchment and incompetence. Many other studies (Fama and Jensen, 1983; Morck et al., 1988; Stulz, 1988; Barnhart and Rosenstein, 1998), however, find out a nonlinear relation between managerial ownership and firm value.

Since the 1980s the main focus of this literature has been fixed on the impacts of ownership concentration on company performance. Fama and Jensen (1983), and Shleifer and Vishny (1986) argue that theoretically a larger shareholder who has a large enough stake can monitor the management so as to largely overcome the traditional free rider problem characterized by the diffused small shareholders case. Although a large number of studies suggest a positive role for the larger shareholder, some researchers find that there is a non-linear relation between ownership concentration and the company's performance. Some researchers even find an insignificant or negative impact of ownership concentration on company value (McConnell and Servaes, 1990; Bianco and Casavola, 1999) and maintain that the role of ownership concentration on company value depends on the type of owner (Nickell et al., 1997). Recent corporate governance literature shows that the current main agency problem in corporate governance across the world is how to restrict the expropriation of minority shareholders by controlling shareholders (La Porta et al. 1999).



The aforementioned findings about the ownership-firm value relation are far from conclusive. Demsetz (1983) argued that firm's ownership structure is endogenously determined to maximize shareholders' interests. Holderness, Kroszner and Sheehan (1999) and Demsetz and Villalonga (2001) confirm the endogeneity of corporate ownership. If ownership is endogenously determined, then our understanding of the relation between ownership structure and firm performance is biased by spurious results from misspecified models. Cross-section methods adopted by the majority of the above studies are rendered unsuitable by the endogeneity of a firm's ownership structure so that panel data methods emerge as a preferred way to study the ownership-firm value relation.

As mentioned in the previous chapter, we will focus on the role of ownership structure and corporate governance. The reform of gradually privatizing state-owned enterprises (SOEs) in China produced highly concentrated corporate ownership and delegated many effective control rights to managers. Although the state still has ultimate control rights for many large and strategically important companies, China provides us with a unique partially privatized environment to study the influence of different corporate ownership structures on mitigating agency problems to improve corporate governance.

This chapter is organized as follows. In the next section we discuss the managerial ownership and firm value relation. Section 2.3 reveals the role of controlling shareholders in corporate governance. Tunneling behaviors by controlling shareholders are further explored in Section 2.4. The following section reviews the endogeneity of ownership structure. Finally, we summarize the chapter in Section 2.6.

## **2.2 Managerial Shareholding and Firm Value**

### **2.2.1 Traditional Agency Theory**

Berle and Means (1932) saw that due to the separation between ownership and control, conflicting goals between shareholders (principle) and managers (agent) will give rise to managerial agency problems (moral hazard and adverse selection) when ownership of a modern firm is widely dispersed. Under a widely dispersed ownership, monitoring of

managers has “public goods” features in the sense that collecting information and monitoring the manager benefit all shareholders. But the relatively small cash value of this to any individual shareholder makes it less worthwhile to them than free riding. As a result, an unaccountable manager may take control of the firm and might pursue private benefits by rewarding low competence, and indulging in high perquisite consumption, and non-profit-maximizing investment.

Agency theory in corporate governance was pioneered by Jensen and Meckling (1976), who established a contract framework to describe the agency relation between shareholders and managers in corporate governance. In the contract, shareholders delegate control (the decision-making of the firm) to managers. Both shareholders and managers have own self-utility-maximizing objectives, so that conflicts of interests between them inevitably result in “residual loss” to all shareholders. They define agency cost as the sum of shareholders’ monitoring cost, the deposit paid by the manager to guarantee his accountability and competence, and residual loss.

Agency relations exist universally in the economy. Agency problems arise when there are conflicts of interests between a principal and an agent in the delegation of control and when the effective monitoring of the agent becomes unavailable or expensive. Thus agency theory has been focusing on two issues: finding the optimal contract to align interests between shareholders and managers, and improving monitoring forces through internal corporate mechanisms and effective external markets (capital, labor, and production markets). Jensen and Meckling (1976) suggest managerial shareholding as a method to align interests of the firm’s management and shareholders, so as to mitigate the agency problem. From the monitoring forces perspective, Fama (1980) advocates that efficient capital and labor markets can serve as information mechanism to curb managers’ self-serving opportunism and behaviors.

### **2.2.2 Managerial Shareholding in Corporate Governance**

The separation between ownership and operation under a widely dispersed ownership gives rise to the agency problems caused by the unaccountable manager’s non-profit-maximizing behavior (Williamson, 1963a, 1963b; Jensen and Meckling, 1976). Jensen

and Meckling (1976) suggest managerial shareholding as a method to mitigate the management incompetence and unaccountability. Jensen and Meckling theoretically advocate the ‘convergence of interests’ hypothesis (incentive alignment effect) that the positive wealth effect of more managerial ownership will align managers’ interests with those of shareholders, so that firm value increases monotonically with managerial ownership.

Supporting evidence for the incentive alignment effect was found by other researchers. Mehran (1995) uses a randomly-selected sample of 153 US manufacturing firms in 1979 and 1980 and finds that incentive compensation of executives and managerial ownership are positively and significantly related to firm performance. By studying 60 of 90 IPO (initial public offering) firms in Finland in 1984 and 1993, Keloharju and Kulp (1996) shows that firm performance is positively affected by managerial ownership, but the relation is only weakly significant. Morck et al. (2000) and Chen et al. (2003) study Japanese PLCs respectively and collectively find results supporting the incentive alignment effect of managerial shareholding.

Many other studies, however, discover a nonlinear relation between managerial ownership and firm value. Fama and Jensen (1983), argue that with lower level holdings of firm shares, managers are disciplined by market forces so that they are more motivated to maximize firm value, whereas with high levels of managerial share holdings, the liquidity of firms’ shares is reduced and managers entrench to pursue self interest maximization, so that firm value decreases. Morck, Shleifer and Vishny (1988) studying a cross-section sample of 371 U.S. Fortune 500 firms for 1980 found a positive relation between managerial ownership and firm value when managerial ownership is either below 5 per cent or above 25 per cent, and a negative relation between 5 per cent and 25 per cent. Stulz (1988) suggests that with larger ownership of the firm, managers carry out more entrenchment activities so that they become more capable and more motivated to fight against takeover threats and increase the price for the firm to be taken over. Moreover, by studying 1173 companies in 1976 and 1093 companies in 1986 in the U.S., McConnell and Servaes (1990) detect a quadratic (inverse U-shaped) relation between Tobin’s Q and managerial ownership. Cui and Mak (2002) focus on high R&D PLCs in the U.S. market, and find a W-shaped relation between Tobin’s Q and managerial

ownership. Although three studies all examine the U.S. market, different patterns of relation between firm value and managerial ownership are found. Barnhart and Rosenstein (1998) reconfirm the curvilinear result of Morck et al. (1988) by using an OLS specification with industry dummies.

To sum up, managerial ownership generates two conflicting effects on managers' behavior: the incentive alignment effect and the entrenchment effect (Morck et al., 1988; Shleifer and Vishny, 1997). The non-linear relation between managerial ownership and firm value arises because of the dynamic dominance between the interest alignment effect and the entrenchment effect through all levels of managerial ownership. At low levels of managerial ownership, shareholders and outside market forces (labor, production, and take-over markets) have considerable influence on managers so that the interests of managers tend to be aligned with those of shareholders. In other words, the manager's value maximizing incentive dominates his self-serving incentives. However, as managerial shareholding increases, pressures from shareholders and outside markets become relatively limited so that managers might become entrenched in their position to carry out self-serving activities even at the expense of firm value reduction. Nonetheless, with very high ownership, managers have to take into account considerable benefits forgone when pursuing private benefits through their non-value-maximization activities, so that the interest alignment effect is expected to dominate the entrenchment effect.

On the other hand, Demsetz (1983) argues theoretically that a firm's ownership structure is endogenously determined to maximize shareholders' interest. According to Demsetz, managerial ownership should be regarded as an endogenous variable that is jointly determined by firm external environment, and internal characteristics such as industry affiliation, investment opportunity, growth potential, and asymmetric information. Thus heterogeneous firms might have different optimal ownership structures. Further, Demsetz and Lehn (1985) employ a linear model to study 511 US large corporations and discover firm profitability is independent of managerial ownership. Agrawal and Knoeber (1996), Holderness et al. (1999), and Demsetz and Villalonga (2001) confirm the endogeneity of managerial ownership by finding no statistically significant relation between firm value and ownership structure. Himmelberg et al. (1999) use a fixed effects model to examine 600 U.S. listed firms between 1982 and 1984, and also fail to detect any significant

influence of managerial ownership on firm value.

Some researchers even find the causality runs from firm value to managerial ownership. Loderer and Martin (1997) use a simultaneous equations framework to examine the causality between executive stock ownership and firm performance for firms involved in acquisitions. They found that higher Tobin's Q ratios lead to greater managerial ownership, but not vice versa. Cho (1998) finds similar results, and using simultaneous equations and piecewise OLS regression shows that the endogeneity of ownership structure produces conflicting results on firm value and ownership structure. Rose (2005) studied Danish listed firms in 1998-2001, and using piecewise OLS regression and 3SLS found that managerial ownership increases with firm performance (Tobin's Q).

The endogeneity of a firm's ownership structure renders the cross-section methods adopted by the majority of the above studies unsuitable. So panel data methods come to be a preferred way to study the managerial ownership-firm value relation. Unlike the results from cross-section studies by Morck et al. (1988) and McConnell and Servaes, Cho (1998) employs simultaneous equations using two-stage least squares (2SLS) to control for endogenous managerial ownership. He finds little evidence that firm value is dependent on managerial ownership. Himmelberg et al. (1999) employed a fixed effect panel data model to control for unobservable inter-firm differences, but failed to find any statistically significant effects running from managerial ownership to firm value. In contrast, the reverse causality between managerial ownership and firm value is supported by Krole (1996)'s finding that with its value increased, the firm might increase managerial ownership as a reward. Further evidence has been found that with other conditions equal, managers who have insider information tend to increase managerial ownership as an investment (Loderer and Martin, 1997), or choose stock options as rewards (Cho, 1998) if they believe firm value will increase in the future. Nevertheless, Short and Keasey (1999) use a cubic specification on a sample of U.K. listed companies between 1988 and 1992, and find firm value is a curvilinear function of managerial ownership. This is similar to results by Morck et al. (1988) but with two new inflection points (at 12 per cent and 40 percent). Furthermore, Lee and Ryu (2003), studying the South Korean market, justify the necessity of panel data methods by confirming the history of managerial ownership changes matters in the managerial ownership-firm value equation in the sense that these

changes can signal to outside investors the insiders' prediction of firm value.

### **2.2.3 Managerial Ownership in China**

Studies on the managerial ownership-firm value relation in China have not reached a consistent result. Wang and Chen (2004) conclude that without a well established takeover market, there is a less pressure for managers to entrench to protect themselves by increasing their ownership of the firm, and instead managerial ownership is used as an effective tool to improve managers' incentive to maximize firm value. In other words, firm value is a monotonically increasing function of managerial ownership. Yu (2003) suggests a linear relation between total (average) firm shares held by directors and firm's ROE (rate of return on common shareholders' equity), although a curvilinear function was not found. Zhou and Sun (2003) find that for fast growing companies there exist positive relations between managerial ownership and firm performance. Zhang and Chen (2002) and Xu and Pu (2003) also find managerial ownership has positive effects on firm value.

Nevertheless, Yuan et al. (2000) fail to detect any significant effects arising from shares held by senior managers (directors, supervisors, and other senior managers) on China's listed companies' ROE. Wei (2000) argues there is no curvilinear relation between managerial ownership and firm value in China. Instead, he regards managerial ownership as a welfare arrangement that has not effectively improved managers' incentives. Li (2000), Gao (2001), and Zhang and Song (2002) find no evidence of a significant relation between managerial ownership and firm value.

On the other hand examples of non-linearity have been discovered in the managerial ownership and firm value relation. An inverse U-shaped relation is detected by Wu (2002) between ownership concentration, managerial ownership and firm performance (ROA). Liu and Tan (2005) examine 331 firms listed on the Shenzhen Exchange and find that firm performance is a cubic function of managerial ownership, with two turning points at 0.1138% and 0.1746% respectively.

### **2.2.4 Summary of Studies on the Managerial Agency Problem**

As we can see, these findings on managerial ownership-firm value relation are inconclusive in deciding whether the function of firm value is monotonic, quadratic, or cubic. The finding of endogenous ownership structure has triggered the evolution of estimation methods from cross-section methods to panel data models that take into account firm-specific effects. Besides, the reverse causality between managerial ownership and firm value can sometimes occur. After studying several countries (Australia, Germany, Japan, Spain, UK, and US) with different institutional and legislation backgrounds and diverse corporate governance structures, Miguel et al. (2004) maintain that the nature of the prevailing governance system has a significant influence on the managerial ownership-firm value relation.

Likewise, studies on the managerial ownership-firm value relation in China have not reached a conclusive finding. There are three possible reasons. First, the majority of these studies adopt cross-section methods, without taking into account unobservable inter-firm differences (firm heterogeneity), the endogeneity of managerial ownership, or the possibility of reverse causality between managerial ownership and firm value. Second, the samples used by these studies are mostly dominated by SOEs, where state or state agents are the largest shareholders. Managerial ownership in most SOEs tends to be at quite a low level (an average 0.017%) and is likely affected by government policies and other political factors. Third, some accounting-based measures for firm value, such as ROA (return on assets) and ROE, can sometimes be manipulated by management and the controlling shareholder. Given the fact that the managerial ownership-firm value relation is mainly an empirical issue, with the unique partially privatized ownership structure and reform in China, it is worthwhile carrying out a fresh study on the relation between managerial shareholding and firm value that controls for above three issues.

## **2.3 Controlling Shareholders and Firm Value**

### **2.3.1 The Pervasiveness of Ownership Concentration**

We have already noted that in a well dispersed ownership structure the separation

between ownership and control can easily give rise to traditional principal agency problem: the managerial agency problem. However, recent researches find the dispersed ownership structure is relatively rare outside the U.S. and the U.K. (La Porta et al., 1999; Faccio and Lang, 2002; Franks and Mayer, 2001). Instead, a majority of firms elsewhere around the world tend to have concentrated ownership, with families or the state as their controlling shareholders.

Ownership concentration commonly exists in most developed economies. By using a sample of the largest 10 firms in each of 49 countries, La Porta et al. (1998) find that apart from the U.S and the U.K., where effective shareholder protection is available, a concentrated corporate ownership structure is rather common in most developed economies (e.g. Germany, Italy, Finland, and Sweden), and especially in countries like Greece with weak protection of minority shareholders. A further study by La Porta et al. (1999) focused on the largest 20 publicly listed companies in each of 27 developed economies and showed that for companies outside the U.S. and the U.K only a very small proportion of PLCs have well dispersed ownership, whereas around 64% of PLCs have controlling shareholders. Faccio and Lang (2000) study 5232 firms of Western Europe and find dispersed ownership widely exists in the U.K. and in Ireland, whereas firms in continental Europe mostly have concentrated ownership. They remark that financial institutions normally have dispersed ownership, whereas most non-financial and small firms are controlled by families. Research by Barca and Becht (2001) shows that around half of the firms in Austria, Belgium, Germany and Italy have controlling shareholders whose ownership exceeds 50% of the firm, and half of the firms in Denmark, Spain, and Switzerland have controlling shareholders on average owning 44%, 35% and 35% of the firm respectively. Franks and Mayer (1998) confirm that 85% of German PLCs have a controlling shareholder. Moreover, Prowse (1990) finds cross shareholding is quite common in Japan, and financial institutions and banks control most firms.

In emerging market economies, corporate ownership has become more concentrated due to the absence of effective corporate governance mechanisms and strong investor protection. By studying 2980 companies in 9 East Asian countries, Claessens et al. (2000) provide evidence that over two thirds of these firms have a controlling shareholder and more than 40% of PLCs are under the control of a small number of families. Lins (2003)



argues “pyramid ownership structures are prevalent across virtually all emerging markets”, which give rise to a separation between the voting rights (control) and the cash flow rights (ownership) of controlling shareholders. In South Korea, 67% of large corporations are controlled by founders and their offspring who own less than 10% of these corporations (Joh and Ryoo, 2000). Bertrand et al. (2002) find it is rather common that Indian business groups have controlling shareholders.

For transition economies, transformations in ownership structure, especially from state sector to private sector (privatization), have been one of the basic features. Most transition economies, though not China, carried out some large scale privatization in a shock therapy way, which meant they released previously state-owned assets to non-state entities over a short period of time. Due to their underdeveloped financial markets, and lagging institutional reforms, ownership in these transition economies tends to be highly concentrated and plagued by insider control and the expropriation of minority investors by large shareholders. Insider control in Russia is pervasive and insiders (managers) become controlling shareholders (Barberis et al., 1996; Claessens et al., 1997; Kapelyushnikov, 2000). Controlling shareholders in Russia own on average 32% of firm’s shares (Kapelyushnikov, 2000). Cull et al. (2002) find evidence of insider control in concentrated ownership in Czech Republic.

### **2.3.2 The Separation between Ownership and Control**

It is widely believed that traditionally the separation between ownership and control takes place in dispersed ownership structure. Due to their low voting rights, shareholders in a well dispersed ownership lose control to managers, so that managerial agency problems arise. However, the pervasiveness of concentrated corporate ownership around the world found recently raises a question on this standard separation: under a concentrated ownership, are the ownership and control still separated? If the answer is yes, then how are they separated? Who will benefit from it? This subsection will answer these questions.

## Ultimate Controlling Shareholders

Generally speaking, in order to become a controlling shareholder of a firm and directly control the firm, the shareholder has to own the majority of the firm's shares (more than 50%). However, La Porta et al. (1999) propose the ultimate ownership principle suggesting the *ultimate* control of a firm can be achieved by owning a smaller volume of firm's shares through superior voting rights and pyramid shareholding. La Porta et al. (1999) find controlling shareholders usually gain more voting rights than their actual cash flow rights. Supportive evidence is also provided by Bennedsen and Wolfenzon (2000). Bebchuk et al. (1999) use the term "controlling minority shareholder" to describe the controlling shareholders who use a small number of cash flow rights to ultimately control PLCs. The multiple classes of shareholding, including pyramid shareholding, cross shareholding, and dual class shareholding, result in the separation between control (voting rights) and ownership (cash flow rights), which further gives rise to agency problems caused by controlling shareholders' expropriation of minority shareholders (Bebchuk et al., 1999; La Porta et al., 1999; Faccio and Lang, 2002). Bertrand et al. (2002) find controlling shareholders of firms may use the difference in cash flow rights among firms in the multi-class control structure to tunnel resources and divert investment opportunities to related companies where they have higher cash flow rights.

As far as identities are concerned, La Porta et al. (1999) divide ultimate controlling shareholders into five categories: a family or an individual, the State, a widely held financial institution, a widely held corporation, and others. Accordingly, Claessens et al. (2000) find that apart from Japan and Singapore, firms ultimately controlled by families have the largest separation between ownership and control in all other East Asian economies. Widely held financial institutions and state controlled firms have the largest separation between voting rights and cash flow rights in Japan and Singapore respectively. Using a sample of 5232 corporations in 13 Western Europe countries, Faccio and Lang (2002) find 44.29% of firms are ultimately controlled by families.

## Ultimate Controlling Structures

According to La Porta et al. (1999), a pyramid shareholding structure means the ultimate controlling shareholder controls the firm through a chain of other firms. Under a

pyramid shareholding structure, the cash flow rights of an ultimate controlling shareholder are defined as the sum of the direct shareholding and the indirect shareholding of the firm. The indirect shareholding is the product of the ownerships of all shareholding layers. The voting rights of an ultimate controlling shareholder are defined as the sum of the direct voting rights and the sum of the smallest voting rights in every shareholding chain. For example, if the ultimate controller owns 10% of the shares of firm A, which owns 15% shares of firm B, and the ultimate controller directly owns 8% shares of firm B, then the ultimate controller has 9.5% ( $8\% + 10\% \times 15\%$ ) cash flow rights of firm B, and 18% ( $8\% + 10\%$ ) of the voting rights of firm B. Therefore, by owning 9.5% shares of firm B, the controlling shareholder ultimately maintains and extends her control up to 18% voting rights of the firm B. Pyramid shareholding is so effective for controlling shareholders with low cash flow rights to ultimately control firms that globally it has become the most pervasive ultimate control structure, especially in underdeveloped economies where effective shareholder protection is not available (Mitton, 2002; Almeida and Wolfenzon, 2006).

The main ultimate controlling shareholder of the controlling group can consolidate his status through cross shareholding ownership structure (La Porta et al., 1999). Unlike pyramid shareholding where one ultimate controlling shareholder vertically extends their control of the firm through a chain of firms, cross shareholding is a structure that can allocate voting rights of the firm among those firms in the control chain both vertically and horizontally. A firm can be identified as having a cross shareholding controlling structure when at least one firm in the control chain holds shares of its own holding firm or other firms in the control chain (Bebchuk et al., 1999). Cross shareholding usually involves multi-control chains and the separation between cash flow rights and voting rights will become larger as the number of firms in the control chains and the number of shares they hold in each other increase (Bebchuk et al., 1999; Claessens et al., 2000; Durnev and Kim, 2005). Joh and Ryoo (2000) find top 30 plutocrats in South Korea averagely use 10% cash flow rights to gain ultimate control of large corporations mainly through cross shareholdings.

Dual class shareholding is another way to separate cash flow rights and voting rights. Controlling shareholders can create disproportions between voting rights and cash flow

rights through issuing shares with limited voting rights, so as to enjoy larger proportion of voting rights (La Porta et al., 1999; Bebchuk et al., 1999). When a firm issues two classes of shares: shares with full voting rights (one share one voting right) and shares with limited voting rights, although both classes of shares have the same cash flow right, their holders' voting rights become more disproportional. Faccio and Lang (2002) find dual class shares more often used by firms in Italy, Finland, Sweden and Switzerland. Similar to pyramid shareholding and cross shareholding, the divergence between voting rights and cash flow rights caused by dual class shares issuing, solidifies the controlling status of the controlling shareholder and makes them more likely to expropriate minority shareholders (La Porta et al., 1999).

Countries' heterogeneities in economic and political environment, and social and cultural backgrounds, result in different popularity levels for the above three ultimate controlling structures around the world, which further generate different levels of separation between ownership (cash flow rights) and control (voting rights). Also, firm characteristics also matter in choosing ultimate controlling structures for business groups (Almeida and Wolfenzon, 2006). In many cases, controlling shareholders adopt more complex controlling structures by combining the above three basic structures.

### **2.3.3 Controlling Shareholders in Corporate Governance**

Concentrated corporate ownership, instead of dispersed ownership, has become one of the fundamental features of modern corporations across the world (La Porta et al. 1999). The assumption of homogeneous shareholders does not seem plausible. It is demonstrated that controlling shareholders have a double-edged-sword role in corporate governance since they can mitigate managerial agency problems to improve firm value, but meanwhile they can also cause another type of agency problem by their tunneling behavior. Recent literature on corporate governance extends agency theory from the traditional managerial agency problems to the role of controlling shareholders in corporate governance. It is argued that controlling shareholders have two effects on firm value: the incentive alignment effect and the entrenchment effect (Shleifer and Vishny, 1997; Claessens et al., 2000; Dyck and Zingales, 2004).

## **Incentive Alignment Effect of Controlling Shareholders**

The incentive alignment effect means with large ownership of the firm the controlling shareholder has the incentive to effectively monitor management and maximize firm value. Fama and Jensen (1983) and Shleifer and Vishny (1986), argue that theoretically a shareholder who has a large enough stake can mainly overcome the traditional free rider problem of the diffused small shareholders, and have incentive to monitor management. Wruck (1989), and Franks and Mayer (1995) find that management turnover is higher in firms with large shareholders in developed economies, indicating the positive role of large shareholders in reducing the managerial agency problem. Chidambaran and John (1998) suggest that the presence of large shareholders can mitigate asymmetric information problem in that large shareholders can gradually collect information on managers' investment through "relation investing" cooperation and use their knowledge to avoid managers' short term irrational investments. Bennedsen and Wolfenzon (2000) maintain that controlling shareholders are capable of monitoring managers and can even directly manage firms, whereas other large shareholders of the firm lack the incentive and power to monitor the controlling shareholder.

In emerging markets, Claessens et al. (2000) find a positive relation between cash flow rights of controlling shareholders and firm value in East Asian economies. Studies conducted by Claessens and Djankov (1999) on the Czech Republic and Claessens et al. (1998a, 1999) on East Asia have confirmed the positive relation between the firm's performance and the highly concentrated ownership in these emerging economies. Furthermore, by studying 18 emerging markets with poor shareholder protection, Lins (2003) argues that large shareholders can act as "a partial substitute for missing institutional governance mechanisms."

Controlling shareholders' incentive to engage in value-increasing activities can be affected by different factors. From a dynamic perspective, as the cash flow rights of controlling shareholders increase, the cost for controlling shareholders to expropriate minority shareholders goes up. Durnev and Kim (2005) think both the incentive alignment effect and the marginal cost of tunneling increases as ownership becomes more concentrated, so that controlling shareholders have more incentive to improve firm value. Faure-Grimaud and Gromb (2004) suggest that in a stock market with high liquidity

stock prices can effectively reflect efforts information of large shareholders' activities so that the incentive of large shareholders to carry out value-increasing activities increases. Bloch and Hege (2001) use a control contest model to show how the competition between multiple large shareholders in a firm will reduce the private benefits of control.

### **Entrenchment Effect of Controlling Shareholders**

The entrenchment effect of a controlling shareholder means that with significant control of the firm the controlling shareholder can expropriate minority shareholders to pursue private benefits (Shleifer and Vishny, 1997; Claessens et al., 2000). The recent corporate governance literature shows that the current central agency problem in corporate governance across the world is how to restrict the expropriation of minority shareholders by controlling shareholders (La Porta et al. 1999).

Johnson et al. (2000) use the word "tunneling" to describe the situation where a controlling shareholder carries out legal and illegal activities to undercoverly transfer resources out of the PLC to other firms it controls. Empirical studies (Shleifer and Vishny, 1997; La Porta et al., 1997, 1999, 2000; Bertrand et al., 2002) found controlling shareholders may negatively affect a firm's performance through "tunneling" activities, including managing firm's earnings to steal profits, transferring assets and making transactions at non-market prices to the related companies, irregular loan guarantees, excessive executive compensation, and divert investment opportunities to related companies where they have higher cash flow control. In order to continue tunneling the firm value, controlling shareholders have incentives to manage the firm's earning to conceal the negative effects of their tunneling on the firm. Chaney and Lewis (1995) show how earning management and management of accounting information disclosure influence market assessment of firm value. Faccio et al. (2001) suggest controlling shareholders can expropriate outside shareholders by issuing lower dividends. Shleifer and Wolfenzon (2002) develop a theoretical model of tunneling, find that under plausible assumptions there is a positive relation between investors' protection and firm value. But there is a negative relation between investor protection and the diversion of profits (private profits control through tunneling actions). The results their model predicted are consistent with existing empirical findings (Zingales, 1994; La Porta et al., 1997, 1999, 2002; Claessens et al., 2000, 2002).

Controlling shareholders are more likely to be motivated to tunnel when their voting rights (control) far exceed their cash flow rights (ownership) under the ownership structure of pyramids and cross shareholding of related companies (Claessens et al., 2000; Bertrand et al., 2002). Morck and Nakamura (1999) find tunneling is more likely to take place in firms that controlling shareholders directly manage. Claessens et al. (2000) find that more than two thirds of firms in East Asia are controlled by a single shareholder who is usually closely related to the firm's management. They find pyramid and cross-holding ownership structures are commonly used in all East Asia countries to separate cash flow rights and voting rights, and provide more opportunities for the controlling shareholder to tunnel profits to another related firm where it holds higher cash flow rights.

### **Dynamic Dominance between the Two Effects**

La Porta et al. (1999), Claessens et al. (2000) and Lemmon and Lins (2003) collectively find a negative relation between firm value and the ratio of voting rights to cash flow rights. It is the case that in order to obtain voting rights, a controlling shareholder has to own cash flow rights in the firm. The positive relation between firm value and cash flow rights indicates that the incentive alignment effect of controlling shareholders mainly lies in their cash flow rights. When making the decision of whether to pursue private benefits, controlling shareholders have to take into account the benefit (cash flow rights) forgone due to their non-value-maximization activities. Therefore, as the discrepancies between voting rights and cash flow rights, measured by their ratio, become larger, controlling shareholders become more entrenched and their capability and incentive to carry out tunneling activities to expropriate other shareholders increase. As such, the dynamic discrepancies between controlling shareholder's ownership (cash flow rights) and control (voting rights) will determine the dynamic dominance between the incentive alignment effect and the entrenchment effect of controlling shareholders, which will further determine the ultimate role of the controlling shareholder in corporate governance.

## **2.4 Tunneling by Controlling Shareholders**

The previous subsection has illustrated the entrenchment effect of controlling shareholders negatively affect firm value through different tunneling activities. In this

subsection, we first further define tunneling by controlling shareholders and then summarize the methods empirical studies used to measure the private benefits of control. Finally we specifically review various types of tunneling activities around the world, especially in China.

### **2.4.1 Definition of Tunneling**

Originally, the term tunneling was first employed to describe controlling shareholders' activities of removing assets from PLCs, through undercover ways, in the Czech Republic during the 1990s. Johnson et al. (2000) use the word "tunneling" to name the situation that controlling shareholders expropriate other shareholders through different legal and illegal activities to consolidate their controlling status and undercover transferring resources out of PLCs to other firms they control. Johnson et al. (2000) believe through these tunneling activities controlling shareholders can obtain more private benefits than they are entitled to according to their cash flow rights.

According to Johnson et al. (2000), there are two forms of tunneling: transfer resources out of the firm through self-dealing, and financial transactions that discriminate against minority shareholders. Self-dealing includes not only illegal activities, such as outright theft and fraud (like earning management), but also other seemingly legal activities, such as transferring assets and making transactions at non-market prices to the related companies, irregular loan guarantees, excessive executive compensation, and divert investment opportunities to related companies where they have higher cash flow control. Alternatively, without transferring any assets out of the firm, the controlling shareholder can increase his ownership and control of the firm by financial transactions that discriminate against minority shareholders, such as issuing new shares to dilute other shareholders' equity, insider trading, and creeping acquisitions.

It is noted that tunneling can take place not only in countries with poor shareholder protection, but also happen in developed economies with advanced common law and civil law legal systems (Johnson et al., 2000). The nature of tunneling activities is tools (methods) that controlling shareholders used to gain private benefits of control through



expropriating other shareholders. In other words, tunneling itself does not create any value, but undercover transfers resources to controller shareholders.

### **2.4.2 Motivation of Tunneling: Private Benefits of Control**

It is rather difficult to directly observe and quantify the so called private benefits of control that can be obtained by a controlling shareholder but are not shared by other shareholders (Grossman and Hart, 1980; Dyck and Zingales, 2004). This explains why the expropriation of minority shareholders by controlling shareholders is a universal agency problem under different legal systems around the world. There are two methods empirical studies usually use that indirectly measure the expropriation of minority shareholders: block shares trade premiums (Bradley, 1980; Bradley et al., 1983) and voting premiums (Lease, 1984).

First, the method of block shares trade premium was pioneered by Bradley (1980) and Barclay and Holderness (1989). Bradley (1980) analyzed 161 successful tender offers in the U.S. corporate control market and found bidding firms paid an average premium of 13% for the shares they purchased. Bradley (1980) thus argues this premium was not generated by cash flow rights of the target firm, but the control rights of it. Barclay and Holderness (1989) studied 63 privately negotiated interfirm trades of block shares between 1978 and 1982 in the U.S., and advocated using block trade premiums, the difference between the price per share paid by the acquiring party and the price per share prevailing on the market, to measure the private benefits the controlling shareholder can obtain.

Logically, trading of control block shares usually results in the transference of the underlying firm's control from the current controlling shareholder to the acquirer. It is a stylized fact that after the announcement of the acquisition the firm's stock price will go up thanks to the market's expectation of management and production reconstruction, and new technology introduction. This increase in the stock price reflects the public benefits the acquisition brought to all shareholders of the target firm *before* the acquisition actually takes place. As a result, when the acquirer eventually becomes the controlling shareholder of the firm, his benefits of this acquisition are actually squeezed. Therefore,

the acquirer takes account of this factor and quotes a higher acquiring price per share than the expected prevailing stock price after the announcement of the acquisition so as to obtain private benefits, which are reflected in the difference between these two prices. Dyck and Zingales (2004) study 412 control transactions in 39 countries between 1999 and 2000 and find on average the trading price of block shares is 14% higher than the stock price after the announcement of the acquisition, and the value of control ranges from -4% of firm value (Japan) to 65% of firm value (Brazil). Hanouna, Sarin, and Shapiro (2001) examine 9566 acquisitions between 1986 and 2000 in seven western economies and find the trading price of a control block is on average 18% higher than that when a small number of shares are traded.

Second, for firms with multiple-class shares Lease et al. (1983, 1984) propose voting premiums between prices of shares with different voting rights as a measure of the market value of control. Traditional corporate finance theory suggests under a one share-one vote corporate structure, shares with the same residual claiming rights should have the same price. Thus, a price difference in shares with the same residual claim rights but with differential voting rights reflects the market value of voting rights, which is linked to the extraction of private benefits by a controlling shareholder (Zingales, 1994). Empirical studies on vote value have been carried out across the world with different samples for Canada (Smith and Amoako, 1995), UK (Megginson, 1990), Italy (Zingales, 1994), US (Lease et al., 1983; Zingales, 1995), South Korea (Chung and Kim, 1999), Sweden (Rydqvist, 1996). These studies confirm the existence of voting rights' value in that they collectively found that shares with higher voting rights have higher prices than those shares with lower voting rights or without voting rights. Nenova (2003) examines 661 firms issuing shares with differential voting rights in 18 countries and finds the market value of controlling block vote varies widely across countries in a range of voting value from zero (Denmark) to 50% of the firm value (Mexico).

As we can see, the above two measurement methods of private benefits of control can only be applied under different conditions. The methods are not substitutes for each other. The method of block shares trade premium is suitable for firms with block trade of shares, whereas the voting premium method is for firms with multi-classes of shares with differential voting rights. Besides, although private benefits of control is a common

economic phenomenon that can happen in any firm with concentrated ownership, the contents (forms) of private benefits of control and methods (tunneling activities) controlling shareholders used to extract private benefits are rather different across countries. Both methods are originally used in developed markets where a developed equity market and a corporate control market are available. Thus it is difficult to claim that in underdeveloped stock markets of emerging markets the above mentioned two methods can be widely used to measure the expropriation of private benefits by controlling shareholders.

### **2.4.3 Tunneling around the World**

From a legal perspective, investors are better protected in countries with common law systems than in countries with civil law systems, where concentrated corporate ownerships are more likely to be used as a substitute mechanism to poorer investor protection against managerial agency problems (La Porta et al., 1998, 1999). However, under a concentrated ownership, conflicts of interests between the controlling shareholder and other shareholders arise because of the private benefits of control. Controlling shareholders may extract private benefits through “tunneling” activities (Johnson et al., 2000). As different complicated ultimate controlling structures are used by controlling shareholders, the interests conflicts become intensified as the proportion of private benefits of control in the whole benefits set of the controlling shareholder gets larger, thanks to the sharper separation between ownership and control under these structures (Claessens et al., 2002; Bertrand et al., 2002). Tunneling by controlling shareholders has become an ever-increasingly focal agency problem across the world (La Porta et al., 1999).

Some studies examine the determinants of tunneling. A low level of investor protection and a high relevant marginal tax rate might give corporate insiders more motivation to tunnel (La Porta et al. 2000; Thomsen, 2005). La Porta et al. (2000) also find that stronger minority investors pressure corporate insiders to make higher dividend pay-outs. Bertrand et al. (2002) and Claessens et al. (2002) confirm the sharp discrepancy between controlling shareholders’ voting rights and their lower cash flow rights results in

tunneling activities. Volpin (2002) reports firms with many large shareholders tend to have higher firm value than those with just one large shareholder, indicating the positive monitoring role played by non-controlling large shareholders. Further, Gutierrez and Tribo (2004) show the evidence that the presence of other large shareholders squeezes the private benefits of control of the controlling shareholder.

Tunneling methods (channels) have been another subtopic where mostly the relation between tunneling and firm value is examined. Shleifer and Vishny (1997), Bebchuk et al. (1999), Wolfenzon (1999) and Claessens et al. (2000) collectively show the expropriation of minority shareholders is more likely to take place by means of “intra-group transfers of assets and control stakes” in firms affiliated to a business group that is normally controlled by a controlling shareholder. Bertrand et al. (2002) confirm controlling shareholders of Indian business groups use the associated transactions between members of business groups to tunnel resources out of listed companies. Chang (2002) and Joh (2003) provide evidence of tunneling through associated transactions in Korean market.

Some researches show controlling shareholders might use dividends as a tunneling tool. La Porta et al. (2000) find that under a common law system where shareholders are better protected, firms tend to issue higher dividends, which reduce insiders discretionary spending. Faccio et al. (2001) discover controlling shareholders of firms in East Asia issue lower dividends than firms in Europe. Instead, they prefer to carry out investments to gain private benefits of control. They argue the large scale of debts generated in these inefficient investments caused the 1997-1999 East Asia financial crisis. Furthermore, in order to continuously tunnel firm value, controlling shareholders might carry out earning management to conceal any negative effects tunneling caused and the private benefits of control. Leuz et al. (2003) show earning management is more prevalent in countries with poor investor protection. Jian and Wong (2003) provide evidence that earning managements are more likely to take place in group-controlled firms in China.

On the other hand, Friedman et al. (2003) argue that theoretically in order to keep the firm in business and avoid a dramatic stock price decline, the controlling shareholder might prop up the listed firm by injecting own funds and resources. In some circumstances, rescuing behaviors by controlling shareholders send a signal of confidence to the market, so that more outside investors might get involved in the

troubled firm. Therefore, although the propping up by controlling shareholders mitigates the deterioration of the firm, there is a possibility that controlling shareholders benefit from increasing stock prices and the interests of minority shareholders are to be further expropriated.

#### **2.4.4 Tunneling in China**

It is believed that tunneling are more prevalent in emerging markets due to the lack of effective corporate governance mechanisms or strong legal protection of minority shareholders (Claessens et al., 2000). These emerging market economies are normally characterized by concentrated ownership structures, inactive external takeover markets, non-independent boards and low transparency and poor quality information disclosure. Johnson et al. (2000) argue the main reason for the 1997-1998 Asian financial crisis is tunneling by controlling shareholders in these countries.

Recent studies in corporate governance focus on expropriation of minority shareholders in China. Tang and Jiang (2002) find the expropriation of minority shareholders in China's stock market is more severe than developed economies. Lee and Xiao (2002) and Qiao and Zhou (2003) respectively provide evidence of tunneling through earning management by controlling shareholders in China's PLCs. Su and Zhu (2003) show that firms under the control of family business groups use the separation between voting rights and cash flow rights to expropriate other shareholders. Due to the tradability constraints, controlling shareholders might forgo profitable investments and issue high dividends to get cash flow in short period of time (Liu and He, 2005; Liu et al., 2004; Xiao, 2005). Li et al. (2004) argue that firms controlled by business group suffered more from the tunneling of funds extraction. Chen (2005) finds that although the number of associated transactions is negatively related to the proportions of independent directors on the board and the ownership of non-controlling large shareholders, the relations are not statistically significant. Qiu and Rao (2007) confirms the deterring role of independent directors and non-controlling shareholders against funds extraction from PLCs by controlling shareholders, and they also argue that PLCs located in areas with more effective law enforcement and less government interference suffer less from funds

extraction problem. Xiao Chen (2005) shows ownership concentration positively affects the scale of associated transactions. Yan Chen (2006) discovers positive relations between the separation between ownership and control and the scale of associated transaction and funds extraction by controlling shareholders.

## 2.5 Determinants of Ownership Structure

We have demonstrated the relation between firm value and corporate ownership (managerial ownership or ownership concentration). It still remains open whether there is an optimal arrangement of ownership structure in corporate governance. Bolton and von Thadden (1998) asserted, “the issue rather is how often and at what points in a company’s life ownership should be concentrated.” Some empirical studies (Himmelberg et al., 1999) argue it is due to unobservable heterogeneity of companies and potential endogeneity of ownership that the ambiguity of ownership structure on company performance is often empirically found. Specifically, these unobservable characteristics of companies affect both ownership structure and company performance. Omission of them may give rise to a spurious relation between ownership structure and company performance.

Demsetz (1983) and Demsetz and Lehn (1985) regard ownership structure as endogenously determined. This strand of the literature on endogenous ownership (Demsetz, 1983; Demsetz and Lehn, 1985; Himmelberg et al., 1999; Demsetz and Villalonga, 2001) tends to conclude that different companies can only identify their *own* optimal ownership structure by taking account of a company’s own characteristics, such as company size, the pressure of the competition and degree of regulation in the given industry, the marginal benefit of improving monitoring system of the company, and the uncertainty the company faces.

As far as transition economies are concerned, researches on the endogeneity of ownership structure are especially important because these countries have experienced different reform policies and have been characterized by ownership transformations, company restructuring since the mid 1990s. The focal question is how to form an optimal ownership structure that provides effective monitoring mechanisms against agency

problems. Some researchers (Filatotchev et al., 2001) maintain that in transition economies, ownership structure might be an equilibrium outcome of different company-specific factors, such as size, location, past performance, industry, development of the capital market, and political and economic environments. Demsetz and Lehn (1985) find an inverse U-shaped relation between ownership concentration and company size. Dunning and Lundan (1998) add that industry affiliation affects the direction of FDI, and knowledge intensive and high tech companies are most attractive industries to FDI. The results of Dyck (2000) indicate that investment opportunities play an important role in attracting outside investors. Aukutsionek et al. (1998), Dahlquist and Robertsson (2001) point out that when it comes to privatization companies with better past performances are preferred by outsider investors. Consequently, when causality between ownership structure and company characteristics is being studied, panel data is preferred to cross-section data as it provides a time series dimension of companies.

Informational asymmetries have been regarded as another factor. Large and export-oriented companies have the competitive advantage of having more transparent information and being more integrated into international business markets. These advantages will lower the transaction costs for the outside investors so that investment decisions are easier to make. Additionally, a company's location also matters. For example, companies in coastal areas have more opportunities to communicate with prospective investors.

On the other hand, the company itself might face much asymmetric information because of the underdeveloped capital market and its product market uncertainty. It is well accepted that underdeveloped emerging markets are usually characterized by high ownership concentration. However, as we mentioned before, it is due to the lack of effective protection of minority investors in transition economies that controlling shareholders can more easily obtain their private benefits by expropriation behaviors (tunneling) than in advanced economies. Some researchers even argue that the potential for obtaining different levels of private benefits might determine the optimal ownership structure (Grossman and Hart, 1988; Harris and Raviv, 1988). To put it another way, large outside investors will make investment decisions by estimating how much private benefit they can obtain by controlling the company.

## 2.6 Conclusion

In the previous chapter, we state that the research question of this thesis is to discover the role of ownership structure in corporate governance of China. In this chapter, we review empirical studies of the relation between firm value and corporate ownership. Traditional agency problems arise because of the existence of interests conflicts between managers and shareholders. This problem is mitigated by using managerial shareholding as an incentive tool and the presence of large shareholders solves the free-riding problem between shareholders under a dispersed ownership. Nevertheless, due to the pervasiveness of concentrated ownership, the expropriation of minority investors by controlling shareholders has become the main agency problem in corporate governance around the world. Theoretically and empirically it is proved to be the case that private benefits of control generated in the separation between ownership and control motivate the tunneling behavior of controlling shareholders. Accordingly, various types of complex ultimate controlling structures and tunneling methods are used by controlling shareholders to tunnel private benefits.

We particularly concentrated on reviewing empirical studies on managerial ownership and tunneling by controlling shareholders in China. Similar to researches on other markets, there is no conclusive result found on the relation between managerial ownership and firm value. Due to the limitation of the estimation methods used, most studies on the tunneling behavior of controlling shareholders fail to take account of the endogeneity of ownership structure and only reach preliminary results. There is a lack of empirical evidence taking firm-specific effects into account.

In the next chapter, we will explain the institutional background of corporate governance in China, in the course of examining the problems of China's stock markets, and the reasons for the prevalence of tunneling.



# Chapter 3

## Institutional Background

### 3.1 Introduction

China's stock markets were established to help state-owned enterprises raise capital and improve firm performance and value. The partial privatized economic environment and socialism ideology render a complicated ownership structure with different identities of shareholders and highly concentrated ownership and control. The spin-off formation of PLCs results in the strong incentive for controlling shareholders to pursue private benefits of control. In the absence of strong shareholder protection, agency cost caused by tunneling of controlling shareholders has been the main obstacle blocking the development of China's capital market.

Institutional background, such as the prevailing corporate governance system, political environment, and the legal system, is a crucial factor for us to understand controlling shareholder's tunneling behavior. China is experiencing the transition from ex command economy to market economy, and its bottom-upwards gradual privatization and the involvement of governments have produced a unique corporate governance environment, under which tunneling of controlling shareholders are worthwhile studying.

This chapter is organized as follows. In the second section, we first produce background review of China's stock markets and PLCs' ownership structure. The following section introduces the pervasiveness and forms of tunneling by controlling shareholders and then analyzes the institutional reasons for tunneling. In the fourth section, we focus on the main tunneling form, funds extraction by controlling shareholders. We then explored the accounting measurement of funds extraction through loans, and a case study is provided at the end of the section. Finally, the fifth section concludes the chapter.

## **3.2 Stock Markets in China**

### **3.2.1 The Establishment and Development of Stock Markets**

China started its reform at the end of the 1970s. As the reform proceeded to the transition from a central command economy to a market economy from the early 1990s, problems of low efficiency, over-staffing, and low profitability of SOEs (state-owned enterprises) became urgent. With more and more non-performing debt, China's banking system struggled to financially support SOEs. As a result, the Chinese government founded the Shanghai Securities Exchange (SHSE) in December 1990 and the Shenzhen Securities Exchange (SZSE) in July 1991 so as to help SOEs raise money from the market. In terms of regulations and legislation, there is no fundamental difference between these two exchanges and both are supervised by the Chinese Securities Regulatory Commission (CSRC). Between 1992 and 1998, the number of PLCs had grown by more than 60% annually. By the end of 2005 there were 1452 companies listed on the two exchanges and China's stock markets have become the eighth largest in the world with market capitalization of more than US\$ 500 billion.

### **3.2.2 Concentrated Ownership Structure of PLCs**

According to the Chinese official shareholding classification, there are five types of shareholders in the market: the state; legal persons; employees; owners of public tradable A shares, and owners of B and H shares not for domestic issue (foreign companies or individuals). This complicated classification of shareholders in this share issuing privatization process (SIP) reflects the partial privatization economic environment resulting from the bottom-upwards gradual privatization in China. The state, legal persons, and tradable A share owners are the three main shareholders, accounting for 46%, 18% and 25% of total shares respectively in 2001 (Liu and Sun, 2005). Notably, because of socialism ideology, shares held by the state are predominant in the market and shares held by both the state and legal person owners are non-tradable shares. In other words, shares held by state and legal persons are not allowed to be traded in the public stock market, but can only be transferred at negotiated prices with permission from relevant

authorities. As a whole, two thirds of PLCs' total shares are non-tradable. As a result, the artificial division of shares in tradability results in a highly concentrated and persistent ownership structure in China. The five largest shareholders account for 60.6% of equity, compared with 25.4% in the United States and 33.1% in Japan. On average, the largest shareholder holds more than 40% of the equity in China.

### **3.2.3 Ultimate Controlling Shareholder**

Although there are five types of shareholders, from the ultimate controlling shareholders perspective, the state predominantly controls over 80% of PLCs in the market and its ultimate control of PLCs are achieved mainly by pyramid shareholding (Liu and Sun, 2005). Specifically, the state *directly* controls some PLCs through government departments, such as the state assets management bureaus, and *indirectly* controls some PLCs through state agencies including state-controlled corporations, state-owned enterprises (SOEs), and state assets investment and management institutions. Among the assets of these state agencies, SOEs are the major source of PLCs' controlling shareholders. In 2001, nearly 60% of PLCs in China's market were directly controlled by SOEs. This can be explained by the fact that many SOEs spin off their profitable assets to form PLCs so as to raise capital. SOEs left with non-profitable assets and over manning serve as controlling shareholders of these PLCs.

## **3.3 Tunneling by Controlling Shareholders in China**

### **3.3.1 The Pervasiveness and Consequences of Tunneling**

In the absence of strong protection of minority shareholders, the highly concentrated ownership in China's stock market is plagued with expropriation of minority shareholders by controlling shareholders alongside other problems such as high volatility, high speculation, and low information transparency. There are three forms of tunneling controlling shareholders carried out to expropriate minority shareholders: funds extraction from PLCs through irregular corporate loans, associated transactions on non-

market prices, and irregular associated guarantees.

Specifically, the spin-off formation of PLCs determines their close relations with their controlling shareholders. It is a rather common scenario: controlling shareholders directly “borrow” funds from PLCs and use them for a long time as free loans, delaying repayment when requested. Many SOE controlling shareholders of PLCs do not even have operational assets to make profits to keep their over-staffed organizations in operation, so they can only manage to do so by using PLC loans. Controlling shareholders can also tunnel resources out of PLCs through buying from PLCs at lower-than-market prices and selling to PLCs at higher-than-market prices. Noticeably, in order to prevent the PLC from being delisted or get new shares issuing rights, without injecting actual funds into the PLC, sometimes the controlling shareholder buys from the PLC at higher-than-market prices, and sells to the PLC at lower-than-market prices. Besides, PLCs sometimes make loan guarantees for controlling shareholders and their associated parties, so that PLCs will have to bear the financial risk and even pay the loan themselves once the actual borrowers cannot pay back the loan.

In practice, the latter two forms of tunneling often eventually result in the situation that controlling shareholders owe money to PLCs and the possibility to pay back this loans become slimmer as time goes. As such, it has been widely believed that corporate loans between controlling shareholders and PLCs is the main channel for controlling shareholders to tunnel resources out of PLCs in China’s stock market.

The detrimental consequences of tunneling by controlling shareholders have become increasingly obvious. Tunneling has been regarded as one of the fundamental reasons for highly volatile stock prices. Tunneling impairs investors’ ability to make rational decisions so that speculation dominates the market. As a whole, an epidemic of tunneling in China had profoundly negative impacts on the investors’ confidence and the credibility of the stock market. PLCs suffering from tunneling witness a loss of investment opportunities and a loss of sustainable development capacity, which will have a disastrous influence on their growth prospects. In order to escape from being delisted, controlling shareholders manipulate PLCs’ profits and earning to conceal these negative effects their tunneling caused to PLCs. In some of the worst cases the PLCs involved have had to be delisted because they could not recover and so manage to make profits in

the three years after tunneling took place.

### **3.3.2 Reasons for Tunneling in China**

The artificial division of shares by tradability, as a result of China's partial share issue privatization, is widely believed as the fundamental reason why the expropriation of minority shareholders is so pervasive in China's stock markets. First, it gives rise to a highly concentrated and persistent ownership and control structure within PLCs (Liu, 2005). The illiquidity of large shareholder's equity consolidates the controlling shareholder's controlling status since it creates institutional barriers for both internal take over by other large shareholder's and the external take-over market. As a result, the controlling shareholders become more entrenched and enjoy a higher degree of control than their actual ownership. On the other hand, atomistic shareholders have the right to trade their shares in the market. But because there are almost no representatives for minority shareholders in any PLC's board, in practice they cannot effectively gain enough power to vote down the controlling shareholders' non-profit-maximizing decisions, and so protect themselves. In addition, the institutional division in tradability heightens interest conflicts between large shareholders and atomistic shareholders. The market value of minority shareholders' equity will increase as firm value increase, whereas large shareholders' equity can only increase through an increase of net assets of the PLC, since prices of equity transference are based on the net assets of the PLC. Different objectives between large shareholders and minority shareholders make it more difficult to align large shareholders' interests to maximizing firm value.

The second reason for the epidemic of tunneling in China reflects the formation of PLCs. Most PLCs were formed from profitable assets that were spun off from their previously SOE owner, whereas SOEs retain the rest of the necessarily worse quality and non-operating assets to form holding companies as the controlling shareholders of these PLCs. The assets left with SOEs are normally characterized by their non-profitability, over-staffing and hence overlarge social obligations, and even high liabilities. Besides, it is the case that dividends are quite low in China, and these SOE controlling shareholders cannot obtain funds by liquidating their shares thanks to the tradability constraints. Consequently,

when controlling shareholders badly need funds to maintain their operation, they quite commonly turn to the expropriation of minority shareholders of PLCs by carrying out different tunneling activities. On the other hand, PLCs might have to depend on their former SOE owner. Although PLCs are legally independent entities in the market, the spin-off formation of PLCs mostly generate incomplete asset structures, so that the daily operations of these PLCs have to rely on associated transactions to obtain production materials or sell products. As a result, these transactions between PLCs and their controlling shareholders and their associated companies give rise to many opportunities for controlling shareholders to tunnel resources out of PLCs. Cheung et al. (2005) examine associated transactions between China's PLCs and their controlling shareholders, and find associated transactions will cause more damage to firm value and interests of minority shareholders when the controlling shareholder is state-owned.

The third reason comes from ideological factors. As a legacy of the ex-central command economy, apart from generating profits, Chinese SOEs have to assume social obligations, such as reducing unemployment and keeping social stability. Under "administrative governance" from local governments, fulfillment of these obligations has always been one of the indispensable performance indicators of SOEs' top managers, whose appointment can effectively be affected by the central or local governments. Chen et al. (2004) report that almost half of directors in their sample are appointed by state controlled owners and one third of directors are affiliated to different levels of government agencies. They also conclude that politically connected CEOs tend to focus on the fulfillment of their political aims, instead of improving firm value. However, as the transition towards a market economy proceeds, these social obligations have severely hampered the efficiency and profitability of SOEs. The contradiction between firm performance and fulfillment of social obligations becomes especially intensified for those SOEs that spin off good assets to form PLCs. With non-profitable assets, these SOEs struggle to generate profits and raise money from banks. In order to fulfill social obligations to secure their future promotion, managers of these SOEs and even some officials of local governments tend to "justify" their behavior of tunneling funds from PLCs by regarding it as "politically" correct. Many managers even still think of PLCs as subsidiaries of SOEs, instead of companies jointly owned by the public and large

shareholders. In many cases, these managers tend to give state assets superior status to private assets. Actually, as a socialist country with an underdeveloped social safety net, China is facing a dilemma between getting its PLCs on the right development track and maintaining social stability by avoiding too much unemployment.

Political factors are the fourth reason. The majority of PLCs listed in China are under the control of their former SOE owners, which in turn are ultimately controlled by the central government or local governments. Table 3.1 below shows the distribution of ultimate controllers of China's PLCs between 2001 and 2003. As we can see, the central government controls 23% of PLCs, whereas over half (53%) of PLCs are ultimately under the control of local governments. Different levels of governments are all facing multiple targets. From the central government perspective, although the SOEs it controls might irregularly extract funds from PLCs, its ultimate target is to keep a balance between the sustainable development of the capital market and reduction of unemployment and salary and pension arrears in SOEs. Besides, the protection of minority shareholders is also crucial to China's social stability because the public have been heavily involved in the stock market since it was established (Liu, 2005). However, the target set by the local governments might not be the same as that for the central government. Under a one-party political system, local governments in China are normally competing with peers at the same level, and officials in such a system really must show outstanding political performance in order to get rapid promotion. Given the fact that the political performance of local governments is primarily based on the survival of the large SOEs in their jurisdiction, local officials might sometimes disregard the interests of minority shareholders of PLCs by providing inactive supervision on tunneling. In order to meet some regulations stipulated by the central government, some local government agencies even actively facilitate local listed firms to conduct earning management through favorable asset-related transfers (Chen et al., 2003).

Actually, local governments are normally reluctant to severely penalize a SOE that is involved in tunneling. In China's unique political system, local courts are controlled by local governments since the judge is elected by the local people's congress, and the local court is supervised by the local people's congress. This institutional arrangement results in a lack of effective enforcement at local levels in the law system. It is quite rare for the

central government to penalize officials of local governments for their inactivity on such occasions, unless concrete evidence of corruption is found.

**Table 3.1 Ultimate controllers of China's PLCs between 2001 and 2003**

<b>Ultimate Controller</b>	<b>Number of PLCs</b>	<b>Proportion</b>
Non-government	540	21%
Central government	577	23%
Local governments	1426	56%

**Data Source:** the table is extracted from Xia Li-jun and FangYi-qiang (2005), "Government Control, Institutional Environment and Firm Value: Evidence from the Chinese Securities Market", *Journal of Economic Research*, 5.

Last but not the least, the low legal penalty for tunneling is another crucial reason why tunneling is pervasive in China. First, other large shareholders and minority shareholders play rather limited roles in deterring controlling shareholders' tunneling behavior. The tradability constraint inevitably generates conflicts of interest between other large shareholders and minority shareholders. So far due to the limitations in civil law and to a lack of punishment spectrum in current securities laws, minority shareholders cannot take either the PLC or its controlling shareholder to court. MacNeil (2002) maintains that China's courts traditionally tend to protect State interests and lack experience to deal with private plaintiff-driven litigations. The first case of such litigation accepted by courts in China dates from July 8<sup>th</sup> 2004 when a minority shareholder of Lianhuaweijing (PLC stock code: 600186) took the controlling shareholder, Lianhuaweijing Group, to the local court to protest the latter's extraction of the PLC's funds. This weak internal and external monitoring increases controlling shareholders' incentives to carry out tunneling through various channels. Second, generally speaking, regulations CSRC launched to deter large shareholders' tunneling are not practically enforceable since most of these regulations and notices are qualitative and lack specified quantitative criteria. Pistor and Xu (2005) note that both private and public enforcement of investor rights and contractual disputes are extremely weak in China. Third, few regulations or laws specifically directly constrain controlling shareholders and their managers involved in tunneling. It should be noted that CSRC does not have the legal right to directly investigate PLCs' bank accounts, let alone investigate PLCs' controlling shareholders' bank accounts. Even if controlling shareholders of PLCs are caught breaking regulations, some penalties, such as



rectification within a certain amount of time, internal censure, public censure, or restriction on issuing new shares, are normally applied to the PLCs, instead of their controlling shareholders. Even if courts identify tunneling problems, the poor quality and non-operating assets retained by SOEs impair their ability to fulfill court decisions. Liu (2005) argues some government regulations that are asymmetrically in favor of SOEs give rise to many problems in China's stock markets. Fourth, in China the supervision of auditing and accounting firms is so weak that transparency in the market is extremely low. By studying China's PLCs annual reports between 1999 and 2001, Liu and Zhou (2005) find no correlation between employment of high quality auditing firms (Big Five audit firms) and the quality of these reports. Allen et al. (2004) suggest overall weak auditing in China hampers the growth of listed firms. Furthermore, Defond et al. (1999) find when more rigorous auditing standards are newly launched, PLCs might change their auditors from high quality to low quality ones so as to avoid negative comments in their annual reports. Given the fact that business opportunities with PLCs are quite valuable in a fierce competition environment, and there is no particular law or regulations clearly stipulating their legal responsibilities regarding auditing tunneling, auditing and accounting firms are more likely to please their existing PLC customers or inactively implement their supervision. As tunneling methods have become increasingly concealed, the market and the authorities have to rely on precise accounting and auditing information.

So, a complete solution to tunneling problems by controlling shareholders requires systematic transformations in institutional barriers, ownership structure, and the legal system. The high occurrence and persistence of tunneling in China suggests this is a time-consuming process. After all, it is not only about finding China's own "optimal" ownership structure for PLCs, but also working out an effective system against such behavior throughout the whole economy.

### **3.4 Funds Extraction by Controlling Shareholders**

#### **3.4.1 Pervasiveness of Funds Extraction**

According to the Notice of CSRC and the SASAC (State-owned Assets Supervision and

Administration Commission) of the State Council “Concerning Some Issues on Regulating the Funds between Listed Companies and Associated Parties and Listed Companies’ Provision of Guaranty to Other Parties”, in China funds extraction by controlling shareholders is the most widely used tunneling method to transfer assets and profits out of PLCs. According to relevant regulations by CSRC, the extraction of PLC’s funds by controlling shareholders includes the controlling shareholder “borrows” PLC’s funds, the controlling shareholder makes the PLC entrust its funds to it for future investment, the PLC repays loans for its controlling shareholder, the PLC produces non-transaction-involved commercial acceptance to its controlling shareholder, the PLC pays staff salary, welfare and insurance, and advertisement fees for the controlling shareholder, and the controlling shareholder gets loans from banks by using loan guarantees provided by the PLC.

From a legal perspective, these expropriation of PLC’s funds are wrongdoings of controlling shareholders. Although CSRC launched regulations and notices against controlling shareholders’ funds extraction from PLCs through irregular corporate loans, such supervisions are normally “in principle” and lack quantitatively enforceable criteria. The newly revised Company Law, Securities Law and Criminal Law in 2005 added terms regarding the expropriation of shareholders and stipulate that any expropriation of shareholders by controlling shareholders or managers should be prohibited and compensation must be made according to the loss it causes. But the scope of the loss caused by the expropriation remains unclear. Duan Yalin (2001) and Xiong Zhewen (2006) have found that funds extracted by controlling shareholders are reaching almost epidemic proportions.

Table 3.2 below illustrates how fast this problem has grown between 2002 and 2005. As we can see, each year large numbers of funds were extracted to controlling shareholders’ hands. The proportion of PLCs suffering from fund extraction by controlling shareholders has been large throughout these years, and even almost reached 60% in 2002. Noticeably, this proportion fell remarkably from almost 50% to less than 30% in 2004 and 2005 thanks to the increasingly strict supervision. But the level of funds extracted, as shown in the last column, did not reduce dramatically, and they still accounted for a high proportion of total capital raised each year in China’s stock market. Take 2002 as an

example. Around 96.7 billion of RMB has been extracted from PLCs and used by their controlling shareholders and it almost equals the total amount of new capital raised in the stock market that year (RMB 96.175 billion).

**Table 3.2 Funds Extraction of China's PLCs**

Year	Problematic PLCs / Total number of PLCs Listed in the year	Funds Extracted (billion of RMB)
2002	57.53% ( 676/1175)	96.7
2003	49.44% (623/1260)	57.7
2004	29.41% (405 / 1377)	50.9
2005	27.67% (396/1431)	45.6

**Data source:** Information is extracted from China's Security and Bond Market Research Database (2005), GTA.

### 3.4.2 A Case of Fund Extraction by Controlling Shareholders

#### Case Background

We take Lianhuawei (stock code: 600186) as an example (source: [www.business.sohu.com](http://www.business.sohu.com) 20 May, 2005). Lianhuawei is a renowned state-owned enterprise in China's glutamate industry and was the second largest glutamate provider in the world. Its annual production capacity reaches 300 thousand tons of glutamate and it controls 40% of the domestic market. Soon after Lianhuawei was listed in 1998, Lianhuawei Group, which controls over 50% shares of the PLC, started to make long-term free use of the PLC's funds. At the beginning of 2003 the funds used by the controlling shareholder was RMB 224 million. Despite a notice of rectification within a certain amount of time received in August from CSRC, funds extracted by the controlling shareholder still rocketed to RMB 698 million at the end of 2003. The number further increased by RMB 251 million in the first quarter of 2004, reaching RMB 949 million. The quarterly report of Lianhuawei showed that up to the end of Sep 2004, the funds extracted by its controlling shareholder had reached RMB 1001 million. Consequently, due to lack of investment funds and operating capital, the fixed cost of unit glutamate increases, which dramatically squeezes profits of the core business, and staff salaries and pensions were also severely in default. With soaring trade and non-trade receivables, the PLC started to run a deficit in 2003 and can only manage to operate with short-term loans

from banks. The situation continued for the first three quarters of 2004, and the loss reached RMB 71.61 million. At the end of 2004, it barely escaped the labeling of “ST” (special treatment) by CSRC thanks to its fairly low earnings of RMB 0.005 per share.

## **Case Analysis**

Lianhuaweijing Group, as the controlling shareholder of Lianhuaweijing, has always held more than 50% of the PLC’s shares. Its control is further solidified by placing its directors, supervisors and managers in Lianhuaweijing. With majority voting rights and insider control, Lianhuaweijing Group becomes quite entrenched and extracts funds of RMB 1 billion through various means.

We have already noted that according to the Notice of CSRC and the SASAC (State-owned Assets Supervision and Administration Commission) of the State Council “Concerning Some Issues on Regulating the Funds between Listed Companies and Associated Parties and Listed Companies”, controlling shareholders must not expropriate other shareholders of PLCs. The revised Company Law, Security Law, and Criminal Law have stipulated that compensation must be made according to the size of the expropriation. Thus the loan of RMB 1 billion should be required to be paid back by Lianhuaweijing Group within a specified time. But these laws should have taken indirect detrimental consequences of this expropriation into account as well. Additionally, minority shareholders should be given legal rights to litigate the controlling shareholder once they reckon it is necessary.

To mitigate these tunneling by controlling shareholders, it is also necessary to enhance the internal monitoring forces. First, there should not be overlapping personnel arrangement between the PLC and the controlling shareholder. Second, independent directors should be appointed independently of controlling shareholders. At least, the interests of independent directors should not lie in the controlling shareholder’s hand. Third, other large shareholders, especially institutional ones, should be introduced into the ownership of the corporation.

### 3.4.3 Accounting Measurement of Funds Extraction

According to accounting practice, there are two types of loans between controlling shareholders and PLCs: loans generated through ordinary transactions and loans generated through non-operational processes. The former type of loans is regular trade borrowings and recorded in PLC's "Accounts Receivables" and "Advances to Suppliers". It is rather difficult to tell if the loan is irregular unless detailed relevant transaction is disclosed. On the other hand, the latter type of loans is borrowings unrelated to ordinary trades and recorded in PLC's "Other Receivables". In the accounting standard, "Other Receivables" normally records non-operational receivables, such as compensation receivables, and prepaid deposits. Under normal circumstances, the balance of "Other Receivables" should not be large. In practice, however, many PLCs use this accounting item to record non-transaction-involved loans borrowed by their controlling shareholders. This might be because in the annual report it is only required to disclose "Other Receivables" balances at the beginning and the end of the year. Given the loose supervision from independent directors and weak regulatory enforcement, "Other Receivables" has been increasing dramatically and become a major channel for controlling shareholders to carry out irregular borrowings, embezzlement and misappropriation of funds from PLCs. As such, "Other Receivables" more effectively reflects the funds extraction by controlling shareholders than "Accounts Receivables".

Table 3.3 below shows loans between PLCs and controlling shareholders between 2001 and 2005. The loans generated in ordinary transactions between PLCs and controlling shareholders and the number of PLCs involved are relatively stable. Since 2002 the transaction-based loans controlling shareholders owe PLCs have gradually increased, even in 2003 when SOEs in China witnessed a fast growing period due to the market's increasing demand for production materials. Whereas non-transaction-involved loans between PLCs and controlling shareholders and the number of PLCs involved have large deviations during these years. This reflects the flexibility in controlling shareholders' use of Other Receivables. Given the fact that controlling shareholders can extract and use funds of PLCs in the middle of an accounting year, the cumulative extraction of funds through non-transaction-involved loans should be much larger.

**Table 3.3 Funds Extraction through Loans between PLCs and Controlling Shareholders**

Year (Total Num. of PLCs)	Account Receivables (billion of RMB)	Num. of PLCs Affected	Other Receivables (billion of RMB)	Num. of PLCs Affected
2001 (1058)	9.660	197	1.359	26
2002 (1130)	6.834	188	19.450	415
2003 (1260)	7.732	241	2.120	42
2004 (1377)	8.848	268	23.864	407
2005 (1431)	8.891	249	2.317	380

**Data source:** China's Security and Bond Market Research Database (2005), GTA.

A convincing evidence of using other receivables as a good proxy of tunneling can be found from Table 3.4 below, which illustrates the correlation between firm performance ROA (return on assets) and balances of their other receivables accounting item in the previous year by using our sample.

**Table 3.4 Correlations between ROA and Other Receivables**

	ROA <sub>t</sub>	OR <sub>t-1</sub>	DAR <sub>t-1</sub>	SIZE <sub>t-1</sub>
ROA <sub>t</sub>	1.00			
OR <sub>t-1</sub>	-0.19	1.00		
DAR <sub>t-1</sub>	-0.15	-0.07	1.00	
SIZE <sub>t-1</sub>	-0.17	-0.09	0.13	1.00

**Note:** ROA<sub>t-1</sub> is the return on assets of the current year; OR<sub>t-1</sub>, DAR<sub>t-1</sub>, and SIZE<sub>t-1</sub> are the proportion of the amount of other receivables due from controlling shareholder and its affiliates in total asset, total liability, and logarithm of total asset in the previous year respectively.

**Data Source:** Author

The negative correlation between ROA in the current year and other receivables in the previous year shows impairing economic consequences to firm performance caused by irregular funds extraction conducted by the controlling shareholder and its related parties. Although the absolute magnitude is not very high, it still outperforms total liabilities in the previous year, a standard indicator, to predict firm's future ROA. It should be noted that this might just be the case only in China and other emerging markets where stock markets are underdeveloped and effective institutional setting is lacking.

Furthermore, taking the year 2002 for instance, if we rank PLCs according to ratios of the total other receivables to total assets, we have the top ten PLCs as follows: Changchun Gaoshida (stock 600670), Guangdong Weida (stock 000603), Jiangxi Zhiye (stock 600053), Meihang Group (stock 600700), Maikete Group (stock 000150), Meierya group (stock 600107), Sichuan Dingtian (stock 600139), Datong Cement Group (stock 000673), Changling Huanghe (stock 000561), and Shandong Tongren (stock 000509). Averagely, the ratio of total other receivables to total assets reaches 49.2%, which is abnormally high taking into account the accounting nature of other receivables item. What's worse, the proportion of the amount of other receivables due from the controlling shareholder in total other receivables reaches an average of 57.3%. For the top twenty PLCs in the rank, the above two percentages reach 40.44% and 51.46% respectively. As a consequence of severe irregular funds extraction through other receivables, six of top ten (twelve of the top twenty) PLCs in the rank had witnessed very poor performance in the past three years and were labeled "ST" (special treatment) by CSRC in 2002. Five of top ten (fourteen of top twenty) PLCs in the rank were given "Unclean" comments by auditing firms in their annual reports.

As such, although tunneling by controlling shareholders globally has been carried out through various channels, it is rather evident that controlling shareholders of China's PLCs use other receivables as one of their major tunneling channels to extract funds out of listed companies. It is practically plausible to employ "other receivables" as an indicator for tunneling by controlling shareholders in China's stock markets.

### **3.5 Conclusion**

The fast development of China's stock markets has been overshadowed by the predominance of state ownership, which is mostly fulfilled by state-owned institutions through pyramid controlling structures. SOEs controlled listed firms have a tradition of low managerial ownership, which is a legacy of share issuing privatization. On the other hand, the predominance of state ownership gives rise to a highly concentrated corporate ownership structure. As a result, the main conflicts of interest arise between controlling

shareholders and minority shareholders, which is the main agency problem negatively affecting the ownership-and-firm value relation.

Controlling shareholders carry out various types of tunneling activities through different channels to extract private benefits of control. The “carve-out” forming process of China’s PLCs and the tradability constraints imposed on shares held by the state and legal persons turn out to be the fundamental reasons for the epidemic of tunneling. Other institutional arrangements, such as legal system and ideological reasons, are also important factors for the epidemic tunneling in China’s stock markets.



# Chapter 4

## Methodology, Data and Variables

### 4.1 Introduction

This thesis focuses first on the relation between firm value and corporate ownership, especially the ownerships of two agents (managers and the largest shareholder) in corporate governance. Theoretical and empirical literature suggests the ultimate influence of the largest shareholder's ownership on firm value will be determined by the dynamic dominance between the incentive alignment effect and the entrenchment effect over different ownership levels. Therefore, we employ a firm value model that is a cubic function of managerial ownership and quadratic function of the largest shareholder's ownership to capture the non-linear pattern of influence of corporate ownership. A potential fraught problem with this firm value model lies in the endogeneity of ownership variables. Facing the difficulty of finding good quality instruments and the possibility of correlation between unobserved firm-specific characteristics and endogenous ownership variables, two-stage panel data methods are applied in a simultaneous equation model.

The second objective of this thesis is to further examine how the expropriation of minority shareholders by the largest shareholder (tunneling) takes place in China's PLCs. We modify the Allingham-Sandmo (1972) income tax-evasion model that is well known in public economics, to integrate factors of listed companies. Hypotheses are generated from the tunneling motivation analysis. We then choose the estimation method by first rejecting static models due to the high persistence in tunneling decision making. Among dynamic models, allowing for not only the correlation between the unobserved heterogeneity and explanatory variables, but also the initial conditions problem, we finally choose a dynamic random effects probit model.

The rest of this chapter is organized as follows. The next section develops the firm value model and corporate ownership models respectively and the hypotheses these models implied. In section 3 we modify the Allingham-Sandmo (1972) income tax-evasion

model by taking into account different factors of listed companies. Data and variables are presented accordingly in the fourth section, where descriptive statistics and analysis of variables are also provided. Section 5 concludes the chapter.

## 4.2 Ownership and Firm Value Relation

### 4.2.1 Firm Value Model and Hypothesis

Jensen and Meckling (1976) advocate the ‘*convergence of interests*’ hypothesis that under a dispersed ownership structure, firm value is a monotonically increasing function of managerial ownership, suggesting managerial ownership as a way to mitigate principal-agency problems caused by unaccountable managers. Fama and Jensen (1983), however, produce the *entrenchment hypothesis* that with high level managerial shares, managers have more control of the firm to pursue self interest maximization by carrying out entrenchment activities, so that firm value decreases when managerial ownership increases. Morck et al. (1988) use Tobin’s Q and return on equity as measures of firm performance, and shares held by directors as a measure of managerial ownership. They find a curvilinear function with a positive relation at low (below 5%) and high shareholding levels (over 25%) and negative association at intermediate shareholding levels. Morck et al. (1988) believe the manager operates with two conflicting incentives: to maximize firm value and collectively benefit other shareholders, and to pursue his own interests.

On the other hand, the influence of largest shareholders on firm value is of a pattern similar to an interactive process between the interests alignment effect and the entrenchment effect. A non-linear relation between firm value and a controlling shareholder’s ownership has been widely reported (Shleifer and Vishny, 1997; La Porta et al. 1997, 1999, 2000; Bertrand, Mehta and Mullainathan, 2002). Specifically, at a low level of ownership, the largest shareholder does not have absolute control of the firm and is constrained by other shareholders and the market. At high ownership levels, however, the largest shareholder becomes more influential and entrenched in the firm, and starts to

pursue private benefits by carrying out “tunneling” activities, such as managing the firm’s earnings to steal profits, transferring assets and making transactions at non-market prices with related companies, unreasonable loan guarantees, excessive executive compensation, and diverting investment opportunities to related companies where they have higher cash flow control. In recent corporate governance literature the expropriation of minority shareholders by controlling shareholders is shown to be the current central agency problem in corporate governance across the world (La Porta et al. 1999).

Since the 1980s the convergence of interests hypothesis and the entrenchment hypothesis have been the fundamental hypotheses for a series of empirical studies with different samples and estimation methods. Therefore, the ultimate influence of managerial ownership and the largest shareholder’s ownership on firm value will be determined by the dynamic dominance between the incentive alignment effect and the entrenchment effect over different ownership levels. As such, we develop the first hypothesis of this thesis as follows:

**Hypothesis 1:** Firm value is a cubic function of managerial ownership and a quadratic function of the largest shareholder’s ownership. As ownership increases, firm value first increases, then decreases, finally increases.

Short and Keasey (1999) study managerial ownership and firm value relation using the following cubic function, which is a general extension of Morck et al.’s curvilinear model:

$$Performance = \alpha_0 + \alpha_1 MO + \alpha_2 MO^2 + \alpha_3 MO^3 + \beta ControlVariables + \varepsilon \quad (4.1)$$

MO stands for managerial ownership. In order to examine how the whole corporate ownership affects firm value, we integrate the largest shareholder’s ownership terms into the above model, giving:

$$Performance = \alpha_0 + \alpha_1 MO + \alpha_2 MO^2 + \alpha_3 MO^3 + \alpha_4 LS + \alpha_5 LS^2 + \beta ControlVariables + \varepsilon \quad (4.2)$$

MO and LS are managerial ownership and largest shareholder’s ownership respectively. The coefficients of MO ( $\alpha_1$ ) and of  $MO^3$  ( $\alpha_3$ ) are expected to be positive if the interests alignment effect dominates at low and very high levels of managerial ownership and the coefficient of  $MO^2$  ( $\alpha_2$ ) is expected to be negative if the entrenchment effect dominates at the intermediate levels of managerial ownership. On the other hand, the coefficient of

LS ( $\alpha_4$ ) and the coefficient of LS<sup>2</sup> ( $\alpha_5$ ) are expected to be positive and negative respectively if the interests alignment effect dominates the entrenchment effect at low levels of the largest shareholder ownership and vice versa at high levels of the largest shareholder's ownership. These coefficients of ownership can endogenously determine inflection points in the managerial ownership and firm value relation. As for control variables, we introduce them in the later part of this chapter.

### 4.2.2 Determinants of Ownership Structure

A potential problem of the above specification is the endogeneity of managerial ownership and the largest shareholder's ownership. Demsetz (1983) argues that theoretically corporate ownership is jointly determined by firm external environment, and internal characteristics such as industry affiliation, investment opportunity, growth potential, and asymmetric information. His study finds supports from further researches by Demsetz and Lehn (1985), Kroszner and Sheehan (1999), Himmelberg et. al (1999) and Demsetz and Villalonga (2001) respectively. Endogenous ownership in the firm performance model means the disturbance term  $\varepsilon_i$  in Eq. 4.2 not only affects firm performance but reflects factors that cause changes in ownership variables (MO and LS). If this is the case, the OLS results are no longer consistent and therefore conventional statistic tests are not valid. Consequently, this will make it impossible to isolate the influence of corporate ownership variables on firm performance.

There are two main sources of the endogeneity of ownership variables. First, the simultaneity problem exists between firm value and key ownership variables. In other words, firm value and key ownership variables might be jointly determined. Thus single equation analysis studying the causality from ownership to firm value, even with good instruments, will not properly solve the endogeneity problem of ownership variables. Second, unobserved firm-specific effects affect a firm's ownership structure. Therefore, OLS estimations of the firm value model that do not allow for unobserved firm heterogeneity will inevitably suffer from endogeneity problems. Panel data models can mitigate the endogeneity problem by taking into account unobserved firm-specific effects. As such, controlling these two sources of endogeneity of ownership variables, 2SLS

applied in a simultaneous equation system using a fixed effects model is the most suitable way to more consistently estimate the relation between ownership variables and firm value.

In terms of choosing instruments, each instrument should be individually correlated with the endogenous ownership variable, and uncorrelated with the error term  $\varepsilon_i$ . Any linear combination of these instruments will produce consistent estimates. Since we are using 2SLS in a simultaneous equation framework, apart from potentially endogenous ownership variables (MO and LS), we treat all other regressors in the above firm value model as exogenous variables. Moreover, to control for the simultaneity problem, we integrate firm value (Tobin's Q) into the corporate ownership equation. So we have

For the managerial ownership equation:

$$MO_i = \theta_0 + \theta_1 Q + \theta_2 ControlVariables + v_i \quad (4.3)$$

For the largest shareholder's ownership equation:

$$LS_i = \phi_0 + \phi_1 Q + \phi_2 ControlVariables + \hat{\varepsilon}_i \quad (4.4)$$

Control variables included in the above two ownership equations are empirically important determinants of corporate ownership structure. However, it should be noted that they also serve as control variables in the full firm value model. Loosely, in a single equation analysis, instruments should be variables that affect the endogenous variable but do not affect the dependent variable other than through their effects on the endogenous variable. In other words, if an exogenous control variable is chosen to be an instrument for endogenous ownership variables, it cannot appear in the firm performance model at the same time. But under a simultaneous equation model, all presumably exogenous variables in the whole equation system will be used to estimate predicted values of Tobin's Q and two potentially endogenous variables, MO and LS, although for identification reasons each equation in the simultaneous equation system does not necessarily include the exact same group of regressors. The majority of regressors included in control variables in Eq. 4.3 and 4.4 will be the same. But there are slight differences due to the control factors' closeness to ownership variables and to firm value, even between two ownership variables. These differences will be shown in the estimation process.

### 4.2.3 The necessity for a Panel Data Model

In the previous subsection, we have identified the endogeneity of managerial ownership and the largest shareholder's ownership in the firm performance model. A few observable firm characteristics are excluded from the full firm performance model as instrumental variables to deal with the endogeneity problem. However, good quality data for these instruments does not seem easy to find. Following Demsetz (1983), Himmelberg et al. (1999) argue that managerial ownership is endogenously determined by the contracting environment, which can differ across firms in both *observable* and *unobservable* ways. In order to further mitigate the endogeneity problem of managerial ownership, unobserved firm heterogeneity, such as organization culture and efficiency, access to new monitoring technologies, and skill and quality of firm's personnel, needs to be controlled for as well. Besides, Lee and Ryu (2003) note that the history of managerial ownership needs to be taken into account since it is regarded as an effective signal to outside investors in an inefficient financial market that is full of asymmetric information. As such, panel data approach is better suited than the cross-sectional methods that are traditionally adopted by Morck et al. (1988) and McConnell and Servaes (1990) respectively.

The fixed effects model of the firm value can be written as follows:

$$Q_{it} = \alpha_0 + \alpha \text{OwnershipVariable}_{it} + \beta \text{ControlVariables}_{it} + \mu_i + \varepsilon_{it} \quad (4.5)$$

$\mu_i$  is a firm-specific effect, and  $u_{it}$  is a white noise error term. As we can see, the endogeneity in the cross-section model can come from either the correlation between the ownership and unobserved firm-specific effects  $\mu_i$  s or the correlation between the ownership and  $u_{it}$ . Fixed effects models mitigate the endogeneity problem by allowing for the former correlation. Under the fixed effects model framework we can even apply instrumental variables (2SLS) estimation to further attack endogeneity problems caused by the latter correlation in the model. Nonetheless, to fulfill this, good quality instruments are a precondition. Furthermore, using two-stage panel data methods under a simultaneous equation framework combining firm value model and ownership equations tackle both two sources of endogeneity problem, the unobserved firm heterogeneity and the simultaneity problem, so that more consistent estimates are provided.

## 4.3 Tunneling by Controlling Shareholders

### 4.3.1 Tunneling Model and Hypotheses Development

The background review of tunneling behavior has shown us how severe the problem is globally, especially in emerging market. Now to understand how the decision to tunnel is made and the factors that affect it is on our agenda. In this section, we will modify the Allingham-Sandmo income tax evasion model (Allingham and Sandmo, 1972) by integrating listed-firm factors, and model the decision to tunnel as a non-truth telling behavior with risks.

In order to obtain private benefit, the controlling shareholder starts to manipulate the profits of the listed firm. The actual profit of the firm is  $Y$ . To obtain private benefits, the controlling shareholder tunnels profits  $T$  ( $T \geq 0$ ) out of  $Y$  and underreports the profit of the firm as  $Y - T$ . The private profits come from the unpaid tax,  $Tt$ , and unpaid dividends to the other investors,  $Ti(1 - s)$ , where  $t$ ,  $i$  and  $s$  are the tax rate, dividend ratio and the percentage of the firm's ownership held by the largest shareholder respectively. In this case,  $i$  and  $s$  are the parameters applicable to listed firms that we integrate into the Allingham-Sandmo model. Noticeably, apart from tax and dividends, as a normal operational practice, there should be some retained profits for the firm to undertake future investments. Obviously, although tunneling by the controlling shareholder will undoubtedly reduce the retained profits of the listed company, the only thing the tunneler cares about is his *private* profits.

On the other hand, there are some risks (or punishments) to be borne with tunneling, such as public criticisms, fines and delisting. It is understandable that whether caught or not, the controlling shareholder has to put effort into concealing tunneling behavior by managing accounts, bribing, and even opening a new related company. So we integrate concealment cost  $C$  into Allingham-Sandmo model. It is plausible to assume that  $C$  is a function of a relative strength factor measured by the ratio of shares held by the tunneling controlling shareholder ( $s$ ) and those held by other large shareholders who can serve as internal monitoring ( $k$ ), the seriousness of tunneling measured by the ratio of  $T$  and firm's total assets ( $A$ ). Realistically, we assume  $C'_s < 0$ ,  $C'_{s/k} < 0$ ,  $C'_T > 0$  and  $C'_{T/A} > 0$ .

Note that  $C$  should include the negative impacts the reduction of profits has on the company's stock price. However, given the fact that only one third of total shares are tradable on the Chinese stock market and these price change impacts can hardly draw as much attention as from large shareholders on other stock markets, since their shares are not tradable on the market. Generally speaking, stock prices in China's stock market, unlike stock markets in other countries, do not necessarily reflect the performance and quality of PLCs, since PLCs are under control of large shareholders, and minority investors are powerless and lack the necessary information that should have been disclosed for them to make rational investment decision. As a result, speculation, instead of middle and long run rational investment, dominates minority investors' minds. Such irrationality sometimes gives rise to a strange situation where a PLC plagued by tunneling problems by the controlling shareholder might see price go up. Thus, due to their irrationality our model leaves the stock price out on this occasion.

Thus, if the controlling shareholder tunnels without being caught, the private benefit he can obtain is:

$$M_{nc} = T + (Y - T)(1 - t)is - C \quad (4.6)$$

where  $Y$ ,  $T$  and  $C$  are the actual profits of the firm, profits tunneled by the controlling shareholder, and the cost to the controlling shareholder caused by the concealment of tunneling respectively, and  $t$ ,  $i$ , and  $s$  are the tax rate, dividend ratio and the percentage of the firm's ownership held by the controlling shareholder respectively.

If the controlling shareholder is caught tunneling, on the other hand, the final result he will get is:

$$M_c = Y(1 - t)is - FT - C \quad (4.7)$$

where all parameters are the same as in Eq. 4.6, except  $F$  is a fine rate imposed on the evaded profit  $T$ , and  $F > t$ .  $F$  is greater than  $t$  indicates that once the tunneling is detected, its illegal private benefits  $Tt$  will be confiscated and meanwhile there will be a penalty  $(F - t)T$  imposed. Besides,  $C$  will inevitably take place in both states of tunneling.

It is reasonable to assume that the controlling shareholder derives standard utility  $U(M)$  mainly from his monetary income and is risk averse ( $U'(M) > 0 > U''(M)$ ),



although there might be some other factors like fairness, and less important forms of benefits such as rewarded housing, advanced transportation tools and VIP treatments, and political and social honors. According to expected utility theory, the expected utility of the controlling shareholder facing on uncertain income can be expressed as follows:

$$E[U(M)] = (1-p)U(M_{nc}) + pU(M_c) \quad (4.8)$$

where  $p$  is the possibility of being caught. The choice facing the controlling shareholder to maximize the above expected utility is to decide the amount of profit he wants to tunnel, i.e.  $T$ . The first order condition with respect to  $T$  as an interior solution is:

$$\frac{\partial(E[U(M)])}{\partial T} = (1-p)U_{M_{nc}}'(M_{nc})[1-(1-t)is - C_T'] - pU_{M_c}'(M_c)(F + C_T') = 0 \quad (4.9)$$

We then differentiate the above first order condition with respect to  $p$ ,  $F$ ,  $t$ ,  $i$ , and  $s$  respectively.

$$\frac{\partial^2(E[U(M)])}{\partial(T)\partial(p)} = -U_{M_{nc}}'(M_{nc})[1-(1-t)is] - U_{M_c}'(M_c)F < 0 \quad (4.10)$$

$$\frac{\partial^2(E[U(M)])}{\partial(T)\partial(F)} = -pU_{M_c}'(M_c) < 0 \quad (4.11)$$

$$\frac{\partial^2(E[U(M)])}{\partial(T)\partial(t)} = (1-p)U_{M_{nc}}'(M_{nc})is > 0 \quad (4.12)$$

$$\frac{\partial^2(E[U(M)])}{\partial(T)\partial(i)} = -(1-p)U_{M_{nc}}'(M_{nc})(1-t)s < 0 \quad (4.13)$$

$$\frac{\partial^2(E[U(M)])}{\partial(T)\partial(s)} = -(1-p)U_{M_{nc}}'(M_{nc})[(1-t)i + C_{Ts}'] - pU_{M_c}'(M_c)C_{Ts}' \quad (4.14)$$

Above Eq. 4.10 to Eq. 4.13 show us some insightful implications of how changes in legal system, capital structure and ownership structure can affect the controlling shareholder's tunneling behavior. Specifically, the tunneling model suggests with more effective monitoring systems ( $p$ ) and a more rigorous legal system ( $F$ ), the incentive for the controlling shareholder to tunnel is expected to be reduced. The dividend policy is also expected to affect controlling shareholders' incentive to carry out tunneling.

Increasing dividends ( $i$ ) might serve as a substitute to the private benefits obtained by the controlling shareholder through tunneling. On the other hand, a higher tax rate ( $t$ ) might give rise to more tunneling behavior because this increase will inevitably squeeze the profits set that could be potentially tunneled by the controlling shareholder. Finally, in Eq. 4.14, the shares held by the controlling shareholder ( $s$ ) do not have an unambiguous direction of effects on tunneling. As reflected by aforementioned empirical studies, the effects of ownership concentration on agency problem and firm performance take various patterns under different corporate governance systems. In other words, in some way this is an empirical issue.

In order to examine the occurrence of tunneling, we adopt the following dynamic binary choice model on our panel sample data.

$$\Pr(TUNNEL_{it} = 1) = \Phi(z_{it}\beta + \alpha_1 TUNNEL_{it-1} + \mu_i + u_{it} > 0) \quad (4.15)$$

$$X_{it} \equiv (z_{it}, TUNNEL_{it-1})$$

where  $\Phi$  is the standard normal cumulative distribution function.  $z_{it}$  includes explanatory variables listed in Table 4.1.  $\mu_i$  is a time-invariant-and-firm-specific *unobserved* effect (unobserved persistent heterogeneity, such as managerial quality, and organization efficiency) and  $\mu_i$  is uncorrelated across firms.  $u_{it}$  is the idiosyncratic error terms that captures shocks to the occurrence of tunneling and it will change across  $t$  as well as  $i$ . Both  $\mu_i$  and  $u_{it}$  are normally distributed.

Accordingly, we have the following two hypotheses:

**Hypothesis 2:** increasing the tax rate, decreasing the dividend payout rate, a less efficient auditing system and decreasing the penalty rate will make tunneling more likely.

**Hypothesis 3:** more concentrated ownership measured by the shares held by the controlling shareholder does not necessarily give rise to more tunneling.

These two hypotheses are both related to the occurrence of tunneling, no matter whether the underlying controlling shareholder is tunneling for the first time or not. On the other hand, if we regard tunneling as a crime committed by controlling shareholders, it is plausible for us to assume that there is high persistence of tunneling behavior. Thus we have the following hypothesis.

**Hypothesis 4:** there is a high propensity for a controlling shareholder who tunneled in

the previous year to tunnel again this year.

### 4.3.2 Econometric Methods for Tunneling Model

As far as estimation of the above dynamic model is concerned, the choice of econometric methods will first depend on the relation between  $\mu_i$  and the independent variables. In our dynamic binary choice model, the unobserved persistent heterogeneity  $\mu_i$  can be correlated with independent variables  $X_{it}$ . Unobserved firm-specific effects, such as managerial skill and quality, and organization efficiency and culture, can reasonably be assumed to be correlated with some explanatory variables, like firm performance, i.e.  $COV(z_{it}, \mu_i) \neq 0, t = 0, 1, 2, \dots, T$ . Furthermore, although these unobserved effects cannot be directly observed by or reported to outside investors (the market) and authority in the annual report, yet there is no doubt that the PLC's largest shareholder is familiar with them in a subtle way. In a dynamic unobserved effects model, even if there is no serial correlation in  $u_{it}$ , the unobserved firm-specific effect,  $\mu_i$ , is *necessarily* correlated with the lagged dependent variable, which appears as an endogenous independent variable in the equation. In terms of our model,  $\mu_i$  is correlated with  $TUNNEL_{it-1}$ , i.e.  $COV(TUNNEL_{it-1}, \mu_i) \neq 0$ , since in the period  $t-1$ ,  $TUNNEL_{it-1}$  is the dependent variable on the left side of the equation. Besides, we also use lagged terms of some explanatory variables,  $DIVIDEND_{it-1}$ ,  $ROA_{it-1}$ , and  $AUDIT_{it-1}$ , to see if they affect  $TUNNEL_{it-1}$  directly or through  $TUNNEL_{it-1}$ .

In order to test the above perception of correlation between  $\mu_i$  and  $X_{it}$ , two Hausman specification tests using logit on the balanced panel sample, with and without lagged dependent variable in  $X_{it}$ , are performed to compare fixed effects model and random effects model, and both tests strongly reject the appropriateness of the *standard (pure)* random effect specification with  $\chi^2$  statistic values of 547.67 and 531.3 respectively.

On the other hand, fixed effects specification has its own drawbacks. First, it will drop all time-invariant variables, which include some observable ones that are of interest, such as industry (INDUSTRY), identity of largest shareholder (STATE), and location

(LOCATION). Secondly, as the number of sample units (N) is large, a fixed effects specification will lose many degrees of freedom. Thirdly, when the number of units is large and the number of years is small, using fixed effects model for dynamic models tends to generate inconsistent estimates (Stephen, 1981; Hsiao 1986; Bernard and Jensen, 2004). The consistency of a fixed effects model relies on the number of periods lagged to do the differencing, which means it needs longer panel data. Take Arellano-Bond (1991) Generalized Method of Moments (GMM) estimator as an example. It uses lagged terms of explanatory variables (level) and lagged difference of them as instruments in a first-difference (linear) specification and allows for dynamics in the model (lagged dependent variable). The appropriateness of GMM application crucially relies on the validity of the assumption that the lagged differences of explanatory variables are uncorrelated with the residual, which is difficult to meet. Furthermore, when doing the first difference, GMM not only removes observed time-invariant variables but reduces the sample size considerably. This is obviously not suitable for our short panel sample ( $T = 4$ ).

As such, we have to choose another econometric method. In order to relax the assumption of independence between the individual effects and explanatory variables, we introduce the Mundlak-Chamberlain Random Effects Model (Mundlak, 1978; Chamberlain, 1984), which, unlike the standard (traditional) random effects model, allows for the correlation between the  $\mu_i$  and  $X_{it}$  by introducing time means of time-variant variable(s)  $\bar{x}_i$  to control for individual effects correlated with  $X_{it}$ . And it is plausible for us to chose time means of return on assets (ROA) and the dividend ratio (DIVIDEND) as vector  $\bar{x}_i$ , since both performance indicators are expected to be good proxies for (or closely related to) the unobserved effects affecting tunnel decision, such as management quality, and organization efficiency. Noticeably, this method comes with an assumption that the regression function of  $\mu_i$  is linear either in all time means of time-variant variables or a combination of their lags and leads (Propper and Burchardt, 1999; Arulampalam et al., 2000; Propper, 2000).

$$\mu_i = k_0 + k_1' \bar{x}_i + \eta_i \quad (4.16)$$

where  $\eta_i \sim (0, \sigma_\eta^2)$  and it is independent of  $X_{it}$  and  $u_{it}$  for all  $i$  and all  $t$ .  $k_0$  is the

intercept and vector  $\bar{x}_i$  includes time means of time-variant variables. So Eq. 4.15 evolves into:

$$\Pr(TUNNEL_{it} = 1) = \Phi(z_{it}\beta + \alpha_1 TUNNEL_{it-1} + k_1' \bar{x}_i + \eta_i + u_{it} > 0) \quad (4.17)$$

where  $k_0$  is taken into  $\beta$ , and  $\eta_i$  is uncorrelated with other explanatory variables.

As we can see from Eq. 4.17, in order to capture state dependence in tunneling, by including the lagged dependent variable ( $TUNNEL_{t-1}$ ) in the above Mundlak-Chamberlain Random Effects Model, we are actually using a *dynamic random effects probit model*, which has been used in empirical research (Orme, 1996; Arulampalam et al., 2000; Propper, 2000). In a dynamic panel model with a relative short observation period like ours ( $T = 4$ ), however, the endogeneity of the initial conditions can be crucial to the entire outcome (William H. Greene, 2003). The initial conditions can only be regarded as exogenous if the stochastic process generating tunneling starts accidentally in the same year as our observation of tunneling starts for each individual. This is obviously not the case in our sample. As a matter of fact, the stochastic process generating tunneling in China's PLCs started before the year 2000. As a result, the dynamic panel model suffers from this endogeneity problem called the *initial conditions problem* caused by the correlation between unobserved effects and the initial observation (Hsiao, 1986). In our case that is the correlation between  $\eta_i$  and  $TUNNEL_{i0}$ . If a really strong assumption that the initial observation is exogenous is made, like the pooled probit models we will tend to overestimate the degree of state dependence  $\alpha_1$  (Propper, 2000; Stewart, 2006).

As a result, in order to fix this endogeneity problem, following Heckman (1981a; 1981b) we estimate a reduced form equation for the initial observation ( $RELOCC_{i0}$ ) as follows

$$RELOCC_{i0} = \lambda' q_i + \varepsilon_i \quad (4.18)$$

where  $q_i$  is a vector of strictly exogenous instruments, including not only explanatory variables related to starting period ( $t = 0$ ), time means  $\bar{x}_i$  but also some additional "presample information" suggested by Propper (2000) and Arulampalam et al. (2000) respectively.  $\varepsilon_i$ , with the variance of  $\sigma_{\varepsilon_i}^2$ , is uncorrelated with  $u_{it}$  for  $t \geq 1$ , but is correlated with  $\eta_i$  ( $\text{corr}(\eta_i, \varepsilon_i) = \rho$ ) following the linear specification  $\varepsilon_i = \theta \eta_i + u_{i0}$ ,

where  $\eta_i$  and  $u_{i0}$  are constructed to be orthogonal to each other. Then Eq. 4.18 changes into

$$TUNNEL_{it} = \lambda q_i + \theta \eta_i + u_{it} \quad (4.19)$$

It is assumed  $TUNNEL_{i0}$  is uncorrelated with  $u_{it}$  for  $t \geq 1$ , and all regressors except lagged dependent variables, including  $X_{it}$  and  $\bar{x}_i$ , are uncorrelated with  $u_{i0}$  across all  $i$  and  $t$ .

Equation 4.17 and 4.19 can then be estimated using a Heckman's estimator for a dynamic random effects probit model. Simplifying the estimation into two probit models, one for the model of interest and one for the initial conditions, Heckman two-step method avoids some complicated computations that might not be solved analytically, for example multiple integral computations. Taking account of the correlation between unobserved effects and explanatory variables (including the lagged dependent variable) and correlation between unobserved effects and initial conditions (i.e. the initial conditions problem), Heckman estimator is expected to be the most suitable method to estimate a panel data with much persistence in the dependent variable like ours.

To sum up, in this section we first rule out static models by identifying the persistence in tunneling decision making. Second, among dynamic models, allowing for not only the correlation between the unobserved heterogeneity and explanatory variables by including instrument variable(s)  $\bar{x}_i$ , but also the initial conditions problem, we come to choose a dynamic random effects probit model (Eq. 4.17 and 4.19). Finally, in order to avoid adding a heteroskedastic error term, we decide to use the Heckman estimation command in Stata to estimate our dynamic random effects probit model.

## 4.4 Data and Variables

### 4.4.1 Data Source

All the data is based on the audited Annual Reports of all PLCs and comes from GTA IT Co., Ltd, which is a leading data vendor on Chinese PLCs. Its database records basic

information and trading data in different intervals for all listed bonds in the Shanghai Stock Exchange and the Shenzhen Stock Exchange since 1996. GTA is also a data vendor of WRDS (Wharton Research Data Service) and is the unique China data vendor selected by MSCI-Barra's headquarters (US) and Asia Pacific headquarters (HK). Basically, the data from GTA is internationally recognized.

Data for ownership-and-firm value relation and data for ultimate ownership are from China Listed Corporate Governance Research Database, and data for tunneling is from China Listed Corporate Associated Transaction Database. Both databases are parts of GTA's CSMAR database.

Finally, city level fiscal and unemployment rate information comes from various issues of Chinese Statistics Yearbooks between 2001 and 2005.

#### **4.4.2 Sample Selection**

In 1999, a new version of Company Law was launched by the Chinese government, and this led to many changes in the PLCs' information collected. Thus, in this thesis we select 2001- 2004 panel data on PLCs that issued A shares before the end of 2004 on the Shanghai Securities Exchange and the Shenzhen Securities Exchange. Because their operations are very different from PLCs our data excludes fund management companies as cross-sectional units. But they might appear as an institutional investor, or even the largest shareholder for a PLC. We also exclude firms that just issue H shares since the number of them is quite small. Observations on PLCs with missing values were also removed from the dataset. Finally, firms with Tobin's Q larger than 4 were removed since these outliers would affect the estimation of the relation between firm value and corporate ownership.

As for ownership and firm value relation, observations for each firm start from the year of 2001 (a common date of entry) for the initial conditions, whereas the firm was not removed from the sample until it exited from the stock market before 2004. In other words, no new companies enter our sample between 2001 and 2004. As such, for we have a balanced panel data sample with  $T = 4$  and  $N = 717$ .

As for the tunneling study, observations between 2001 and 2004 are used for each firm.

In total, during the sample years, we have an unbalanced dataset containing 2914 observations.

As for ultimate ownership, within our sample period we only have data for 2004, which comprises 1149 listed companies.

### 4.4.3 Variables

The above ownership and firm value model includes firm value, managerial ownership, the largest shareholder's ownership, and control variables that could potentially affect firm performance. Taking into account empirical studies and China's political and economic environment, we summarize the definition and description of variables in Table 4.1. As mentioned before, most explanatory variables included in the firm value model and ownership equations also appear in the tunneling model since these firm characteristics observed by the market are also observed by the largest shareholder when he makes the decision about tunneling.

**Table 4.1 Description of Variables**

<b>Variables</b>	<b>Model</b>	<b>Description</b>
<b>Dependent Variables</b>		
Tobin's Q	Firm Value Model (FVM hereafter)	The ratio of market value of firm equity to book value of firm total assets. Tobin's Q = (Market Value of All Shares + Book Value of All Debts)/Total Assets
TUNNEL	Tunneling Model (TM hereafter)	Binary choice variable that equals one if there are funds extracted by the largest shareholder and its affiliates through other receivables, and equals zero otherwise.
<b>Independent Variables</b>		
LS	Ownership structure; Appears in both FVM and TM	The ownership of the largest shareholder measured by the proportion of shares held by the largest shareholder to the total shares of the firm
MO	Ownership structure; Appears in FVM	Managerial ownership measured by the proportion of shares held by all directors in the board to total shares of the firm.
STATE	Ownership structure; Appears in both FVM and TM	A dummy variable characterizes the involvement of state ownership in the company, i.e. equals one if the largest shareholder is the state, and zero otherwise.
TOP5LS	Ownership structure (Internal	The cumulative ownership from the second



	monitoring system); Appears in both FVM and TM	largest to the fifth largest shareholder, measured by the sum of shares held by them.
INDIR	Internal monitoring system; Appears in both FVM and TM	The proportion of independent directors in the board.
AUDIT	External monitoring system Appears in both FVM and TM	Dummy variable that equals one if the comments from auditing firm in the annual report are 'non standard comments' and equals zero otherwise.
ROA	Appears in TM	Return on assets to measure the performance of the listed firm $ROA = \text{net profit} / \text{total assets at the end of the year}$
RISK	Appears in FVM	Volatility of the firm's stock price measured by standard deviation of its annual stock price
DIVIDEND	Appears in both FVM and TM	Dividends payout rate, which is cash dividends per share
INTANGIBLE	Appears in both FVM and TM	Intangible assets as a proxy for R&D and advertising expenditure.
SIZE	Appears in both FVM and TM	Firm size measured by the natural logarithm of the company's total assets. $SIZE = \ln(\text{Total Assets})$
AGE	Appears in both FVM and TM	The number of years since the firm got listed
DAR	Appears in both FVM and TM	Debt /Asset ratio $DAR = \text{Annual Debt} / \text{Total Assets}$
LOCATIONE	Appears in both FVM and TM	Location dummy variable equals one if the listed company is located in eastern coastal areas of China, and equals zero otherwise.
LOCATIONW	Appears in both FVM and TM	Location dummy variable equals one if the listed company is located in western areas of China, and equals zero otherwise.
LDEFICIT	Appears in TM	Fiscal deficit per capita of the city where the underlying PLC is situated and politically affiliated to.
RREVENUE	Appears in FVM	Fiscal revenue per capita of the city where the underlying PLC is situated and politically affiliated to.
UNEMPLOY	Appears in both FVM and TM	Unemployment rate of the city where the underlying PLC is situated and politically affiliated to.
SOEWORK	Appears in FVM	The proportion of SOE workers in total workforce of the city
DYEAR	Appears in both FVM and TM	Year dummy variables equal one in the underlying year, and zero otherwise. Data is from 2001 to 2004, so we use three year dummy variables.
DINDUSTRY	Appears in both FVM and TM	Industry dummy variable equals one if the listed company is in the underlying industry and zero otherwise. There are a total of twelve industries, so we use eleven dummy variables.

### **Firm Value (Dependent Variable)**

There are some accounting-based firm performance indicators, like ROE (Return On Equity). These measures are mainly focused on a firm's operating and financial performance, which is expected to be positively related to the firm's stock-market performance in well developed stock markets with higher transparency level and less information asymmetry. However these accounting-based measures of firm performance are more likely to be manipulated, especially in underdeveloped stock markets. Liu (2005) points out that between 1999 and 2001, ROEs reported by China's PLCs disproportionately gather slightly over 0, 6 and 10 percent, indicating two main incentives of earning management: avoiding losses and gaining the right to issue new shares. Jian and Wong (2004) provide more evidence of earning management in China.

We use Tobin's Q to measure firm value, firm's stock-market performance. Tobin's Q is a widely used market-based firm performance indicator and is defined as the ratio of the market value of equity to the book value of the fixed assets of the firm. Due to the difficulty of obtaining the replacement cost of fixed assets, we use the following approximate formula from Chung and Pruitt (1994) to calculate Tobin's Q.

$$\text{Tobin's Q} = (\text{Market Value of All Shares} + \text{Book Value of All Debts}) / \text{Book Value of Total Assets}$$

Short and Keasey (1999) suggest Tobin's Q has the advantage of combining both investment (book value of total assets) and future income generated through these investments (market value of equity). Besides, unlike accounting-based performance indicators that are purely based on events occurred, Tobin's Q has the good merits of also allowing for future expectations, including those on firm's intangible value improvement (like R&D) and future development strategies. More recent research tends to use Tobin's Q as a measure of listed firm performance.

### **Tunneling Variable (Dependent Variable)**

As we mentioned before, funds extraction through irregular loans by controlling shareholders is the most pervasive tunneling activity in China. According to aforementioned institutional background, we set latent variable RELOCC to represent the funds extracted particularly by the controlling shareholder and its affiliates, which are

specifically noted and recorded as a proportion of the balance of “Other Receivables” in the PLC’s financial annual reports. It should be noted that it is not the whole balance of “Other Receivables” but only the proportion of funds due from PLCs’ largest shareholders and their affiliates. The dependent variable TUNNEL is a binary discrete variable which equals one if funds extraction by the largest shareholder and its affiliates through other receivables account takes place ( $RELOCC > 0$ ), and equals zero otherwise.

### **Ownership Structure**

Recent empirical studies show that ownership structure has non-linear effects on firm value. We include the proportion of shares held by managers (board-level directors) to total shares (MO) and the proportion of shares held by the controlling shareholder to total shares (LS) to capture the influence of ownership structure. Their square terms and cubic terms are included to examine the non-linear effects of ownership structure on firm value. In addition, we also use a dummy variable (STATE) to characterize firms with the state or state-owned institution as the largest shareholder in the company. Both empirical studies and hypotheses mentioned above indicate that ownership structure, as an internal mechanism of corporate governance, plays an indispensable role in mitigating agency problems caused by incompetent managers and controlling shareholders.

### **Monitoring Forces against Agency problems**

We employ three variables to proxy internal monitoring forces against agency problems. First, in order to measure the role other large shareholders played in monitoring the behavior of the largest shareholder, we set a variable TOP5LS, which equals the sum of ownerships of the second largest to the fifth largest shareholder. Second, we also take account of the proportion of independent directors on the board, which is denoted as INDIR.

As far as external monitoring forces are concerned, we use the auditing comments made by independent auditing firms in PLCs’ annual reports. A dummy variable named AUDIT is set to equal one if the comments are “non standard comments” and zero otherwise. When we say “non standard comments”, we mean an abnormal significant event(s) has taken place during that year.

## Control Variables

### *Leverage*

The literature shows the different directions of influence leverage has on firm value. On the positive side, Jensen (1986) suggests that debts can constrain managers from discretionary spending over free cash flows. Myers (1977), on the other hand, argues debts limit firms from future profitable investments. Further, Stulz (1988) maintain debts reduce firm's pressure from the takeover market in a sense that debts make the firm's ownership more concentrated. We include the debt-asset ratio (DAR) to capture effects of leverage on firm value.

### *R&D and Advertising*

Since China's accounting system records R&D and advertising expenditure directly in administration expenses, it is impossible for us to get a separate value for these activities. Instead we can only use intangible assets (INTANGIBLE) as proxy for R&D activities and advertising expenditure. R&D and advertising activities are expected to increase firm value through improving a firm's innovation capacity and profitability. On the other hand, Himmelberg et al. (1999) use intangible assets to measure the scope of managers' discretionary spending. In our case of two agents, managers and the largest shareholder, we could extend intangible assets to measure the discretionary spending scope of both insiders in China's PLCs.

### *Liquidity*

Free cash flow is used as a proxy for the firm's liquidity (LIQUIDITY). More cash flow means the firm is more capable of repaying its debts and carrying out future investment. Nonetheless, Jensen (1986) argues that firms with too high free cash flows tend to overinvest.

### *Risk*

Demsetz and Lehn (1985) and Himmelberg et al. (1999) use the volatility of the firm's stock price to measure the risk and uncertainty the firm is facing. We use the standard deviation of daily stock prices in the year as a proxy of risk. We expect firms with highly volatile stock prices to have lower firm value.

### ***Firm Size***

Generally speaking, larger firms tend to have more advanced management systems. These large firms, however, can be easily plagued with low efficiency and lack of transparency. Himmelberg et al. (1999) indicate larger firms are more hampered by agency problems. Nonetheless, Short and Keasey (1999) suggest economies of scale give a larger firm the advantage of low average product cost to create barriers for new entry and eventually improve the firm's performance. We include the natural logarithm of the firm's total assets (SIZE) as a proxy for firm size. Furthermore, larger SOEs in China are normally under some social obligations, such as reducing local unemployment. In this case, administrative interference under these circumstances will negatively affect firm performance.

### ***Firm Age***

Younger firms are expected to more easily take in new technologies and have more potential to grow, so one would expect a negative relation between firm age and firm value. Old firms, however, have advantages in more experience and knowledge of the market. Their connections developed through the years with different parties they are dealing with will count, especially in China. We use the number of years the firm has been listed (AGE) as a proxy for firm age.

### ***Growth***

A firm with greater growth prospects will attract more investors so that its market value is expected to be higher. We include growth rate of firm's net profit (GROWTH) as a proxy for the firm's growth.

### ***Fiscal Deficit***

Due to China's unique economic and political environment, many PLCs are controlled by SOEs, which are commonly under social obligations and intervened by local political authorities. Besides, tradability constraints imposed on shares held by the state and legal persons make the permission of authorities crucial to the success of transferring these shares among owners. As a result, we include city level fiscal deficit (LDEFICIT) per capita and city unemployment rate to capture the political pressure of privatization from the local authorities, to which these PLCs are politically affiliated.

### *Industry & Year*

Under a transition economy, different sectors in China undergo different levels of competition, liberalization, and probably different development prospects. Also, due to different strategic values and development priorities, the government applies different policies to regulate different sectors during the sample period. Thus, it is crucial to include industry affiliation and year dummies to capture industry and policy effects.

## 4.4.4 Descriptive Statistics of Variables

### 4.4.4.1 Descriptive Statistics

Table 4.2 presents descriptive statistics of variables included in the ownership-firm value model and the tunneling model. We find between 2000 and 2004 the ownership

**Table 4.2 Descriptive Statistics of Variables**

Variable	Mean	Std. Dev.	Min	Max
Tobin's Q	1.8768	1.1736	0.9747	3.9964
RELOCC	0.0447	0.1151	0	1.0452
ROA	0.0033	0.1038	-1.4124	0.1643
LS	0.4088	16.3561	0.0697	0.8205
MO	0.0011	1.5276	0	0.3796
TOP5	0.5555	12.9084	0.1219	0.9507
TOP5LS	0.1501	12.3052	0.0019	0.5884
INDIR	0.1805	5.4415	0	0.4286
LIQUIDITY	0.1388	0.2966	0	7.6737
INTANGIBLE	0.0413	0.0613	0	0.7953
DIVIDEND	0.1373	0.132835	0.005	1.2
GROWTH	-2.5580	16.7729	-90.0748	18.99658
RISK	1.2382	0.9329	0.2032	10.5496
AGE	7.8591	2.0971	4	14
SIZE	21.2657	0.8862	17.4965	24.1711
DAR	0.5172	0.1823	0.0081	0.9702

**Note:** Year, industry, and location dummies are left out here.

concentration level (LS) has been kept at a quite high average level (40.88%) in China's stock market. The ownership concentration level will become even higher if we measure it by the top five large shareholders (55.55%). The high average of 31.65% confirms the fact that the stock markets were originally established to financially support SOEs. State ownership still has a huge influence in corporate governance of China's PLCs, such that in many PLCs state and state-owned institutions serve as the largest shareholders.

Nonetheless, the cumulative ownership from the second to the fifth shareholder (TOP5LS) only reaches an average of 15% of the listed company, which is less than half of the largest shareholder's ownership. The average number of independent directors (INDIR) accounts for almost one fifth of the board.

Apart from ownership variables, statistics on firm value (Tobin's Q), the latent tunneling variable RELOCC, and other control variables are also presented in Table 4.2 respectively. Dummy variables are not reported.

#### 4.4.4.2 Managerial Ownership

Table 4.3 summarizes the information on managerial ownership between 2001 and 2004. The selected sample of 717 firms is divided into four ranges by managerial ownership levels. For each year, nearly 90% of firms have managerial ownership below 0.1%, whereas firms with managerial ownership over 10% are hardly found. Through sample years, the number of firms in each ownership range is relatively stable. As a whole, we find managerial ownership levels in China's PLCs are averagely much lower than those in other economies.

**Table 4.3 Breakdown of the selected sample by managerial ownership**

Managerial Ownership	2001 (717)	2002 (717)	2003 (717)	2004 (717)
$0 \leq MO < 0.1\%$	637 (88.84%)	650 (90.65%)	657 (91.63%)	661 (92.19%)
$0.1\% \leq MO < 1\%$	74 (10.32%)	62 (8.65%)	56 (7.81%)	51 (7.11%)
$1\% \leq MO < 10\%$	5 (0.70%)	4 (0.56%)	4 (0.56%)	3 (0.42%)
$10\% \leq MO$	1 (0.14%)	1 (0.14%)	0 (0%)	2 (0.28%)

**Note:** percentages of the number of firms in each category are included in parentheses.

**Data Source:** Author

As far as the changes of managerial ownership are concerned, Table 4.4 reports absolute values of yearly within-firm percentage changes in managerial ownership of our selected sample. There are totally 2151 observations of yearly changes. We find 64% of observations have their managerial ownership changed less than 10%, and many of them have just changed marginally or have not changed at all during sample years. Besides, 12% of observations have witnessed changes in managerial ownership over 100%. Nevertheless, the numbers of observations between 10% and 100% are all quite small.

Specifically, the last three columns of Table 4.4 present the number and proportion of firms for each ownership range in each year.

**Table 4.4 Within-firm changes in managerial stock ownership**

Yearly Percentage Change of Managerial Ownership	Num. of obs. (2151)	2001-2002 (717)	2002-2003 (717)	2003-2004 (717)
$0 \leq  \Delta MO_t / MO_{t-1}  < 10\%$	1381 (64.20%)	423(58.60%)	435(60.67%)	523(72.94%)
$10\% \leq  \Delta MO_t / MO_{t-1}  < 20\%$	71 (3.30%)	29 (4.04%)	25 (3.49%)	17 (2.37%)
$20\% \leq  \Delta MO_t / MO_{t-1}  < 30\%$	112 (5.21%)	52 (7.25%)	32 (4.46%)	28 (3.91%)
$30\% \leq  \Delta MO_t / MO_{t-1}  < 40\%$	100 (4.65%)	38 (5.30%)	38 (5.30%)	24 (3.35%)
$40\% \leq  \Delta MO_t / MO_{t-1}  < 50\%$	26 (1.21%)	10 (1.39%)	11 (1.53%)	5 (0.70%)
$50\% \leq  \Delta MO_t / MO_{t-1}  < 60\%$	127 (5.90%)	46 (6.42%)	51 (7.11%)	30 (4.18%)
$60\% \leq  \Delta MO_t / MO_{t-1}  < 70\%$	39 (1.81%)	16 (2.23%)	12 (1.67%)	11 (1.53%)
$70\% \leq  \Delta MO_t / MO_{t-1}  < 80\%$	17 (0.79%)	9 (1.26%)	7 (0.98%)	1 (0.14%)
$80\% \leq  \Delta MO_t / MO_{t-1}  < 90\%$	12 (0.56%)	8 (1.12%)	2 (0.28%)	2 (0.28%)
$90\% \leq  \Delta MO_t / MO_{t-1}  < 100\%$	4 (0.19%)	0	2 (0.28%)	2 (0.28%)
$100\% \leq  \Delta MO_t / MO_{t-1} $	262 (12.18%)	86 (11.99%)	101(14.09%)	75 (10.46%)

**Note:** percentages of number of firms in each category are included in parentheses.

**Data Source:** Author

Overall, we find managerial ownership of China's PLCs is at quite a low level, and most firms change it slowly over the sample period.

#### 4.4.4.3 The Largest Shareholder's Ownership

In this thesis, we use the largest shareholder's ownership to measure ownership concentration. Table 4.5 below shows the evolution of the largest shareholder's ownership in the original data sample between 2001 and 2004. We find vertically during these years there is a slight downward trend in the average shares held by the largest shareholder. The large standard deviation in each year indicates that the largest shareholder's ownership can change a lot in a cross-sectional way. Nonetheless, corporate ownership of China's PLCs has always been highly concentrated. To this effect, some institutional background is worth recalling. Since the beginning of the reform from ex central planned economy to market economy China's bank system has been struggling to



financially support overstuffed, inefficient and non-profitable SOEs, so that by the early nineteen nineties many large SOEs were turning to the newly established stock market to raise money. However, because of the artificial tradability constraints, shares of China's PLCs are divided into non-tradable shares that are held by the state and legal persons and tradable shares that are held by the public. As a whole, the former accounts for two thirds of total shares and is only transferrable between its holders during the sample period. As a result, with much control of the board and little pressure from external take over market, insiders of China's PLCs became more sluggish and entrenched so that ownership concentration tends to be more persistent compared with other market economies.

**Table 4.5 The average share of largest shareholder of Chinese Listed Companies**

	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>Minimum</b>	0.0697	0.0702	0.0702	0.0702
<b>Maximum</b>	0.8205	0.8205	0.8205	0.8205
<b>Mean</b>	0.4226	0.4126	0.4018	0.3980
<b>Median</b>	0.4409	0.4387	0.4163	0.3999
<b>Std. Dev</b>	16.5933	16.4381	16.2802	16.0288
<b>Num. of firms</b>	1043	1088	1062	1209

**Data Source:** author

We also find the number of listed firms gradually increases, reflecting the market's slow development over the sample period. In the 1990s, the stock market was growing fast because China's underdeveloped financial market could not provide enough advanced investment services and tools, so that people's saving could only be invested in the stock market. However, without effective monitoring mechanisms and a strict law enforcement process to protect minority investors, the expropriation of minority investors by controlling shareholders became so pervasive that insiders in PLCs tend to use the listed company as a free cash machine where they can take money for granted. Besides, the market confidence was severely damaged by Asian financial crisis in late nineties that is mainly caused by irresponsible behavior of controlling shareholders.

The persistence of ownership concentration is further displayed by the following Table 4.6, which reports yearly within-firm changes in the largest shareholder's ownership of 717 firms selected during the sample years. Similar to yearly within-firm changes of managerial ownership reported in Table 4.4, the vast majority of firms change their largest shareholder's ownership less than 10% between 2001 and 2004, whereas the

number of firms experiencing remarkable ownership concentration changes is negligible.

**Table 4.6 Within-firm changes in the largest shareholder's ownership**

Yearly Percentage Change of Managerial Ownership	Num. of obs. (2151)	2001-2002 (717)	2002-2003 (717)	2003-2004 (717)
$0\% \leq  \Delta LS_t / LS_{t-1}  < 10\%$	1924 (89.45%)	634(88.42%)	636(88.70%)	654(91.21%)
$10\% \leq  \Delta LS_t / LS_{t-1}  < 20\%$	90 (4.18%)	34 (4.74%)	34 (4.74%)	22 (3.07%)
$20\% \leq  \Delta LS_t / LS_{t-1}  < 30\%$	42 (1.95%)	15 (2.09%)	14 (1.95%)	13 (1.81%)
$30\% \leq  \Delta LS_t / LS_{t-1}  < 40\%$	33 (1.53%)	14 (1.95%)	10 (1.39%)	9 (1.26%)
$40\% \leq  \Delta LS_t / LS_{t-1}  < 50\%$	29 (1.35%)	13 (1.81%)	11 (1.53%)	5 (0.70%)
$50\% \leq  \Delta LS_t / LS_{t-1}  < 60\%$	15 (0.70%)	3 (0.42%)	7 (0.98%)	5 (0.70%)
$60\% \leq  \Delta LS_t / LS_{t-1}  < 100\%$	16 (0.74%)	4 (0.56%)	5 (0.70%)	7 (0.98%)
$100\% \leq  \Delta LS_t / LS_{t-1} $	2 (0.1%)	0	0	2 (0.28%)

**Note:** percentages of number of firms in each category are included in parentheses.

**Data Source:** author

Table 4.7 below provides the breakdown of original data sample by the identities of the largest shareholder's ownership for each year. Within each year we divide shares controlled by the largest shareholder into four ranges based on key threshold percentages according to CSRC's Administration Note for China's PLCs, including no greater than 10%, between 10% and 33% (including 33%), between 33% and 50% (including 50%), and over 50%. For each domain, consistent with CSRC's uniform classification in listed companies annual reports, we classify listed companies into five different groups according to the identities of their largest shareholder, including state, state-owned legal person, private shareholder, foreign shareholder, and other shareholders respectively.

**Table 4.7 Distribution of companies by ownership concentration and by the identities of the largest shareholder**

Ownership Concentration range (OC <sup>1</sup> ) and type of the largest shareholder	2001 (1043 firms)	2002 (1088 firms)	2003 (1062 firms)	2004 (1209 firms)
OC > 50% (1675 obs.)	412	444	395	424
State	184	173	158	186
State-owned Legal Person	157	196	171	167
Private	62	61	52	51
Foreign	0	0	2	4
Others	8	12	12	16
33% < OC <= 50% (1217 obs.)	352	284	271	310

State	115	131	136	140
State-owned Legal Person	81	91	76	82
Private	142	47	36	61
Foreign	4	4	6	7
Others	10	11	17	20
10%<OC≤33% (1481 obs.)	277	354	386	464
State	77	99	103	117
State-owned Legal Person	63	78	97	105
Private	97	109	124	155
Foreign	8	9	6	11
Others	32	59	56	76
OC≤10% (29 obs.)	2	6	10	11
State	0	0	2	1
State-owned Legal Person	0	3	1	0
Private	2	3	3	6
Foreign	0	0	1	0
Others	0	0	3	4

**Note:** Ownership concentration is measured by the share held by the largest shareholder.

**Data Source:** author

For each year, we find larger number of listed firms gather in higher level of ownership domains. State and state-owned legal persons have accounted for the obvious majority in all ranges except for the under 10% category. By contrast, it is rarely found that foreign investors take control of China's PLCs. Even if the foreign investor is the largest shareholder of the company, its ownership rarely exceeds 50%, i.e. the share level to absolutely control the firm.

On the other hand, as the reform proceeds, after spin-off restructuring and getting listed, majority of state-owned listed companies have witnessed declining performance. It has been proved that incorporation and being listed that was initially designed to improve SOE's performance have failed its mission. More and more SOEs, especially those labeled as "ST" (special treatment) due to their poor performance, sell their legal person shares to private investors under administrative pressure from local authorities who are normally reluctant to lose the listing quota of the local area. Through this way more and more private enterprises manage to benefit from China's fast growing stock markets, although the stock markets were initially established to solve external financial constraints problems for SOEs. Noticeably, compared with PLCs controlled by the state and state-owned legal persons, privately controlled PLCs tend to have a more dispersed ownership, and private largest shareholders gather in the 50% domains. The proportions of observations allocated in the four ranges starting from the bottom are 0.65%, 33.64%,

27.65%, and 38.05% respectively. This suggests majority of China's PLCs have highly concentrated ownership.

#### 4.4.4.4 Persistence in Tunneling

In the above section, we find China's PLCs' ownerships have been highly concentrated over the sample period. Due to the tradability constraints imposed on shares held by state and legal persons, the largest shareholder ownership of China's PLCs tends to be rather persistent. This explains the reason why in the underdeveloped financial market the largest shareholders are more likely to become entrenched and carry out tunneling activities to pursue self interest. According to the Company Law, and Administrative Note of Chinese Publicly Listed Companies from the CSRC, mainly there are three illegal methods for controlling shareholders to carry out expropriation of other minority shareholders, including funds extraction and misappropriation, associated transactions at non-market prices, and irregular associated guarantees. In this study, we use PLCs' balance of "Other Receivables" related to their largest shareholders to measure tunneling. Table 4.9 below shows the decision making pattern of funds extraction by largest shareholders.

**Table 4.9 Percentage and Probability of Tunnel Decision in Two Consecutive Years**

Description	Year (Num. of firms )	2000-2001 (559)	2001-2002 (531)	2002-2003 (499)	2003-2004 (475)	Total (2064)
Percentage Of Change	$T_t = 0 \mid T_{t-1} = 1$	13.24%	10.92%	12.83%	12.63%	12.40%
	$T_t = 1 \mid T_{t-1} = 0$	7.87%	11.30%	10.22%	10.74%	9.99%
	Total	21.11%	22.22%	23.05%	23.37%	22.39%
Percentage Of Persistence	$T_t = 0 \mid T_{t-1} = 0$	14.13%	16.20%	16.63%	19.16%	16.42%
	$T_t = 1 \mid T_{t-1} = 1$	64.76%	61.58%	60.32%	57.47%	61.19%
	Total	78.89%	77.78%	76.95%	76.63%	77.61%
$P(T_t \mid T_{t-1} = 0)$	$P(T_t = 0 \mid T_{t-1} = 0)$	64.23%	58.91%	61.94%	64.08%	62.17%
	$P(T_t = 1 \mid T_{t-1} = 0)$	35.77%	41.09%	38.06%	35.92%	37.83%
$P(T_t \mid T_{t-1} = 1)$	$P(T_t = 0 \mid T_{t-1} = 1)$	16.97%	15.06%	17.54%	18.02%	16.85%
	$P(T_t = 1 \mid T_{t-1} = 1)$	83.03%	84.94%	82.46%	81.98%	73.15%

**Note:** T denotes tunneling (funds extraction) committed by the largest shareholder, which equals one if tunneling takes place that year, and equals zero otherwise.

**Data source:** Author

As we can see, there is a high persistence in funds extraction by the largest shareholders between two consecutive years. This justifies hypothesis 4 aforementioned in Chapter 3, which is that there is a high propensity for a controlling shareholder who tunneled in the

previous year to tunnel again this year. The percentage of persistent tunneling decision between two consecutive years (including tunneling in both years and not tunneling in both years) has a high average of 78%. Specifically, for the largest shareholders who did not tunnel (no funds extraction) in the previous year ( $TUNNEL_{t-1} = 0$ ), 37.83% will change to tunneling in the current year, whereas 73.15% of shareholders who tunneled in the previous year ( $TUNNEL_{t-1} = 1$ ) carry on tunneling in the current year. This persistence in tunneling explains why we include a lagged dependent variable on the right side of tunneling model in above dynamic random effects probit model.

## 4.5 Conclusion

In this chapter, we first develop models for the relation between corporate ownership and firm value (the firm value model), and the possibility for the largest shareholder to carry out tunneling activities (the tunneling model) respectively. Hypotheses and variables are presented for each model. Then theoretically we try to find suitable econometric methods to estimate these models. For the firm value model, we compare cross section methods and fixed effects panel data methods. We find the former is fraught with potential problems of endogenous ownership variables, and its validity is further challenged by the difficulty of finding good instruments. A fixed effects model, on the other hand, mitigates endogeneity by allowing for the correlation between endogenous ownership variables and unobserved firm-specific effects. In terms of the tunneling model, we adopt a dynamic binary model to examine how tunneling persistently takes place in China's PLCs. With a panel data sample, we compare traditional random and fixed effects models with a dynamic random effects probit model. We choose the latter method since it allows for endogeneity of ownership variables, unobserved heterogeneity and dynamic aspects (persistence) of tunneling activities.

Through descriptive analysis, we find the coexistence of low levels of managerial ownership with high levels of the largest shareholder's ownership in China's PLCs. Nonetheless, both types of insider ownership change slowly over the sample period. We also find there is a high propensity for a controlling shareholder who tunneled in the previous year to tunnel again this year.

# Chapter 5

## Empirical Results

### 5.1 Introduction

In this chapter, we first use OLS to estimate the pooled sample in both single equation analysis and simultaneous equation analysis. Comparatively, to allow for unobserved firm-specific heterogeneity, panel data modes are applied in both single equation and simultaneous equation analysis. In order to provide further evidence of the ownership-and-firm value relation, we then use cross-sectional data to analyze the effects of the separation between cash flow rights and voting rights on firm value. The reason for using cross sectional data is due to data availability about the ultimate controlling parties in China's stock markets. On the other hand, the highly concentrated ownership structure in China's stock markets draws attention to the occurrence of tunneling. To allow for the high persistence of tunneling and the endogeneity problem of initial conditions, in latter part of this chapter we use a dynamic random effects probit model to examine the occurrence of tunneling.

The remainder of this chapter proceeds as follows. The second section is a preliminary analysis of the ownership-and-firm value relation on the pooled sample and will be carried out using single OLS analysis and OLS simultaneous equation analysis. The third section uses single equation analysis and simultaneous equation analysis by panel data methods. In the fourth section we use OLS on a cross-section dataset to further examine the role of ultimate controllers in the ownership-and-firm value relation. Then we explore the tunneling occurrence using a dynamic random effects probit model. Finally, we summarize our findings in the last section.

### 5.2 Preliminary Analysis on Pooled Sample

#### 5.2.1 Single Equation Analysis by OLS

### 5.2.1.1 Firm Value Model

Our OLS estimation of the ownership and firm value relation starts on the pooled sample by regressing firm value on ownership variables and control variables. Table 5.1 below presents results of three specifications according to different combinations of managerial ownership and largest shareholder's ownership. All six regressions control for unknown heteroskedasticity by using correction technique of White (1980).

**Table 5.1 OLS Estimation of Ownership and Firm Value Relation with Tobin's Q as the Dependent Variable**

	(1)	(2)	(3)	(4)	(5)
INTERCEPT	4.0324*** (10.22)	4.6703*** (10.22)	4.9379*** (14.55)	22.9082*** (11.26)	22.5879*** (11.12)
MO	-0.0469* (-1.83)	0.1479* (1.65)	-0.3187** (-2.02)	-0.5170*** (-3.75)	-0.3415*** (-2.92)
MO <sup>2</sup>	-	-0.076 (-0.42)	0.0303* (1.87)	0.0441*** (3.24)	0.0266** (2.40)
MO <sup>3</sup>	-	-	-0.0006* (-1.78)	-0.0008*** (-3.05)	-0.0005** (-2.26)
LS	0.0013 (0.51)	-0.0019 (-0.22)	-0.0018 (-0.22)	-0.0070 (-1.02)	-0.0097 (-1.55)
LS <sup>2</sup>	-	0.0002 (0.62)	0.0001 (0.63)	0.0003*** (3.74)	0.0003*** (3.85)
STATE	-0.2327*** (-2.75)	-0.2540*** (-2.91)	-0.2547*** (-2.95)	-0.0819 (-1.07)	-0.0540 (-0.67)
TOP5LS	0.0172** (3.75)	0.0179** (3.83)	0.0181*** (3.83)	0.0180*** (4.81)	0.0158*** (4.67)
INDIR	-0.0422*** (-9.37)	-0.0460*** (-10.70)	-0.0423*** (-11.95)	-0.0252*** (-8.99)	-0.0034 (-0.73)
LIQUID	-	-	-	0.1078 (0.82)	0.0850 (0.62)
INTANGIBLE	-	-	-	-0.3377 (-0.68)	-0.4046 (-0.85)
RISK	-	-	-	0.4262*** (13.82)	0.3917*** (12.63)
DIVIDEND	-	-	-	0.2945 (1.28)	0.1616 (0.74)
DAR	-	-	-	-1.2128*** (-5.14)	-0.1296*** (-4.71)
SIZE	-	-	-	-1.0488*** (-10.20)	-1.0255*** (-10.00)
GROWTH	-	-	-	0.0021 (0.93)	0.0014 (0.64)
AGE	-	-	-	0.0358*** (3.62)	0.0864*** (8.61)
SOEWORK	-	-	-	-0.0523 (-0.72)	-0.1680** (-2.33)
LOCATIONw	-	-	-	-0.0050 (-0.08)	-0.0301 (-0.49)
LOCATIONe	-	-	-	0.3796*** (5.76)	0.2818*** (3.99)
AUDITs	-	-	-	2.57** (0.0252)	1.79 (0.1116)
DINDUSTRYs	-	-	-	-	8.41*** (0.000)
DYEARS	-	-	-	-	45.86*** (0.000)
Adjusted R <sup>2</sup>	0.1101	0.1106	0.1397	0.4089	0.4145
F test	24.10*** (0.000)	24.13*** (0.000)	24.30*** (0.000)	42.83*** (0.000)	43.57*** (0.000)
Observations	2748	2748	2748	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

We have estimated the models with the variables entered individually as a test for multicollinearity, but given the t-tests indicate all three terms are significant, there is no evidence of multicollinearity, or something like this. Specifically, the first three specifications only contain ownership variables, with different combinations of managerial ownership (MO) and the largest shareholder's ownership (LS). With square terms  $MO^2$  and  $LS^2$  added in specification 2, both adjusted  $R^2$  and joint significance just slightly increased. When we expand the model by adding cubic term of managerial shareholding ( $MO^3$ ), the increase in both adjusted  $R^2$  and joint significance of ownership variables become much larger. These improvements justify our cubic specification about managerial ownership in the ownership and firm value relation.

When in specification 4 we include all the control variables, except the year and industry dummies, the adjusted  $R^2$  increases remarkably to 40.89%, suggesting their joint statistical significance. Specification 5 further expands the model by adding the year and industry dummies into the control variables. There is an increase in  $R^2$  to 41.45%. All three regressions confirm a cubic relation between firm value (Tobin's Q) and managerial ownership (MO). Specifically, as managerial ownership increases, firm value will first decrease, then increase, and finally decrease. Noticeably, this finding does not justify our hypothesis of the increase-decrease-increase cubic relation, derived from studies by Morck et al. (1988) and Short and Keasey (1999) respectively. Likewise, we fail to support our hypothesis of an inverse "U" relation between the largest shareholder's ownership (LS) and firm value. Instead, we detect a "U" shaped relation between them in the latter two specifications. We can interpret this point in two ways. The first explanation is that as the largest shareholder increases his shares, firm value will first decrease and then increase. The other one is that investors in China's stock markets give higher valuations to firms with either low or high levels of the largest shareholder ownership than those firms with intermediate levels. This concern reflects the actual pattern of tunneling by controlling shareholders in China. Besides, the changes in significance of LS terms from specification 1 to 2 suggest that the inclusion of control variables affects the influence of LS on firm value.



As far as other ownership variables are concerned, in the last two specifications they are jointly statistically significant and of reasonable magnitudes. Individually, like empirical results regarding the inefficiency of state-owned enterprises, we find that firms with the state (departments) or SOEs as their largest shareholders tend to have lower firm value, although the significance of the dummy variable STATE disappears in specification 4 and 5. Nevertheless, significantly throughout all models all at the 1% level, other large shareholders' ownership (TOP5LS) plays a positive role in improving firm value. The significance of independent directors on the board (INDIR) disappears as we include year and industry dummies. Besides, auditing firms (AUDIT) also fail to work as an effective monitoring force against agency problems to ultimately improve firm value.

In terms of control variables, smaller firms (SIZE) are found to have higher firm value thanks to their higher efficiency and more transparency. Firm value decreases from eastern areas to western areas of China. Firms located in eastern areas are more likely to have higher firm value. We also find firms with longer listing histories (AGE) experience higher firm value because they can signal an image of sustainable development to the market. Nonetheless, although the market regards a low debt level (DAR) as an advantage for a listed firm, firms with more volatile stock prices (RISK) surprisingly are shown to have higher firm value. This can only be explained by the fact that in China's stock market with too much information asymmetry, investors tend to treat high volatility as speculation opportunities, instead of focusing on more solidly grounded factors. Furthermore, the proportion of SOE workers in a city's total work force (SOEWORK) has significant negative effects on firm value. The changes in its significance from specification 4 to 5 reflect the fact that this political factor is closely related to government policies.

In addition, intangible assets (INTANGIBLE) do not significantly contribute to firm value. Besides, although with the expected positive influence, no significant evidence shows firms with faster growth of net profits (GROWTH) have higher firm value. Higher dividend (DIVIDEND) does not increase firm value. This might be explained by the high trade turnover ratio in China's stock markets. By contrast, firms with more free cash flow (LIQUID) are more attractive to investors, but in an insignificant sense. Finally, industry and year dummy variables are significant but not reported.

### 5.2.1.2 Managerial Ownership Equation

Loderer and Martin (1997) suggest the adverse causality between managerial ownership and firm value: manager might decide to hold more shares as firm value (Tobin's Q) increases. In this section, we use OLS on the pooled sample to examine the determinants of managerial ownership. The result is presented in Table 5.2 below.

**Table 5.2 OLS Estimation of Ownership and Firm Value Relation with Managerial Ownership as the Dependent Variable**

	(1)	(2)	(3)	(4)
INTERCEPT	2.2748 ** (2.19)	2.1219 ** (2.03)	2.5817 ** (1.96)	2.4305 * (1.80)
Q	0.0294 * (1.77)	0.0279 * (1.69)	0.0381 * (1.95)	0.0365 * (1.85)
LS	0.0047 * (1.77)	0.0092 * (1.74)	0.0049 * (1.80)	0.0093 * (1.80)
LS <sup>2</sup>	-	-0.0001 (-1.14)	-	-0.0001 (-1.13)
STATE	-0.1088 ** (-2.05)	-0.1132 ** (-2.09)	-0.1112 ** (-1.98)	-0.1155 ** (-2.03)
TOP5LS	0.0046 * (1.72)	0.0044 * (1.64)	0.0046 * (1.77)	0.0044 * (1.69)
INDIR	0.0029 * (1.70)	0.0030 * (1.73)	0.0041 (1.18)	0.0042 (1.19)
LIQUID	0.0212 (0.31)	0.0241 (0.35)	0.0005 (0.01)	0.0030 (0.03)
INTANGIBLE	0.0912 (0.32)	0.0745 (0.25)	-0.1245 (-1.04)	-0.1405 (-1.11)
RISK	0.0201 ** (2.42)	0.0193 ** (2.31)	0.0194 * (1.64)	0.0185 (1.54)
DIVIDEND	0.3451 * (1.75)	0.3601 * (1.76)	0.2975 (1.50)	0.3133 (1.51)
DAR	-0.0914 *** (-2.64)	-0.0914 *** (-2.64)	-0.0542 (-0.86)	-0.0551 (-0.86)
SIZE	-0.0865 * (-1.89)	-0.0835 * (-1.82)	-0.0977 * (-1.69)	-0.0946 (-1.62)
GROWTH	0.0003 (0.81)	0.0003 (0.92)	0.0003 (0.80)	0.0004 (0.89)
AGE	-0.0233 ** (-2.50)	-0.0235 ** (-2.49)	-0.0227 ** (-2.53)	-0.0229 ** (-2.51)
LOCATIONw	-0.0884 (-1.24)	-0.0858 (-1.18)	-0.0954 (-1.24)	-0.0928 (-1.18)
LOCATIONe	-0.0176 (-0.28)	-0.0163 (-0.25)	-0.0352 (-0.45)	-0.0342 (-0.43)
AUDITs	0.77 (0.5711)	0.85 (0.5140)	0.69 (0.6276)	0.70 (0.6197)
DINDUSTRYs	-	-	2.07 ** (0.0197)	2.07 ** (0.0191)
DYEARS	-	-	0.54 (0.6560)	0.54 (0.6570)
Adjusted R <sup>2</sup>	0.0163	0.0166	0.0233	0.0235
F test	2.34 *** (0.000)	2.29 *** (0.000)	1.75 *** (0.0043)	1.76 *** (0.0034)
Observations	2748	2748	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

There are four specifications of managerial ownership equation in Table 5.2. Tobin's Q is significant at the 10% level in each model. Specification 2 and 4 include both LS and

LS<sup>2</sup>, but LS<sup>2</sup> is not statistically significant in either specification. All four models have rather low adjusted R<sup>2</sup>. The inclusion of industry dummies in specification 3 and 4 improves the explanatory power of regressors. The year dummies, on the other hand, do not significantly affect managerial ownership. This is consistent with the descriptive finding of only small changes in managerial ownership over the sample years. In the specification 3, the preferred model, we find firm value (Q) and largest shareholder's ownership (LS) are both significant at the 10% level and positively affect managerial ownership.

As for other regressors, firms controlled by the state departments or SOEs (STATE) tend to have lower managerial ownership at the 5% significance level, whereas other large shareholders' ownership (TOP5LS) positively affect managerial ownership at the 10% significance level. Larger firms (SIZE) tend to have lower managerial ownership due to wealth constraints on managers. We also find firms with longer listing histories (AGE) tend to have lower managerial ownership.

Noticeably, there are some changes in sign, magnitude and significance of regressors when industry and year dummies are added in specifications 3 and 4, indicating the influence of these regressors on managerial ownership rely on the firm's industry affiliation and macroeconomic environment, the latter captured by year dummies. Specifically, intangible assets (INTANGIBLE) changes its sign from positive to negative and its magnitude and significance become larger. Besides, the significance of independent director on the board (INDIR) at the 10% level, dividends ratio (DIVIDEND) at the 10% level and leverage (DAR) at the 1% level disappears. Additionally stock volatility (RISK) becomes less significant from 5% to 10% level.

### **5.2.1.3 Largest Shareholding Equation**

Another potentially endogenous variable in firm value model is the largest shareholder's ownership. In other words, the simultaneity problem can arise in the sense that when firm value increases the largest shareholder tends to increase his ownership accordingly. As a result, OLS estimation becomes inconsistent. In this subsection, we examine the determinants of largest shareholder's ownership. According to the institutional background mentioned before, state ownership is predominant in China's stock markets

and PLCs controlled by state and its agencies are closely related to local governments. Thus we expand the ownership equation by adding three more control variables, the city level fiscal revenue per capita (LREVENUE), the unemployment rate of the city where PLC is located (UNEMPLOY), and the proportion of SOE workers in the city's total work force (SOEWORK). The OLS estimation on the pooled sample is provided in Table 5.3.

**Table 5.3 OLS Estimation of Ownership and Firm Value Relation with Largest Shareholder's Ownership as Dependent Variable**

	(1)	(2)
INTERCEPT	12.9752 *** (8.89)	14.1827 *** (9.64)
Q	0.2571 ** (2.57)	0.2031 ** (2.08)
MO	-2.5535 ** (-2.36)	-2.3991 ** (-2.32)
MO <sup>2</sup>	0.3229 *** (3.31)	0.2057 ** (2.09)
MO <sup>3</sup>	-0.0066 *** (-3.61)	-0.0036 * (-1.94)
STATE	1.9106 *** (5.15)	1.9320 *** (5.29)
TOP5LS	-0.9270 *** (-39.30)	-0.9135 *** (-39.49)
INDIR	0.0515 *** (4.28)	0.0020 (0.11)
LIQUID	1.1529 (1.54)	1.2445 (1.54)
INTANGIBLE	-5.3993 ** (-2.56)	-4.1530 * (-1.94)
RISK	-0.1732 (-1.35)	-0.1288 (-0.99)
DIVIDEND	5.1755 *** (4.31)	4.1720 *** (3.63)
DAR	-4.4224 *** (-5.58)	-4.3303 *** (-5.41)
SIZE	1.8284 *** (7.51)	1.7085 *** (7.20)
GROWTH	0.0050 (0.51)	0.0074 (0.75)
AGE	-0.2310 *** (-3.08)	-0.2571 *** (-3.53)
LOCATIONw	-0.6881 (-1.01)	-0.7814 (-1.32)
LOCATIONe	-1.3959 ** (-2.31)	-0.8198 (-1.26)
UNEMPLOY	-10.6153 *** (-2.90)	-10.8631 *** (-3.14)
SOEWORK	-0.0610 (-0.15)	-0.3227 (-0.81)
LREVENUE	0.0001 ** (2.38)	0.0002 *** (3.95)
AUDITs	1.39 (0.2249)	2.56 ** (0.0257)
DINDUSTRYs	-	15.48 *** (0.000)
DYEARS	-	14.55 *** (0.000)
Adjusted R <sup>2</sup>	0.4872	0.5262
F test	137.01 *** (0.000)	102.96 *** (0.000)
Observations	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests.

\*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

Similar to Table 5.1, we have also estimated the models with the variables entered individually as a test for multicollinearity. Again, there is no evidence of multicollinearity. Since there is no much difference in magnitude and signs of other variables, we do not include all results here. Besides, the inclusion of industry dummies and year dummies, jointly significant at 1% and 5% respectively, increases the adjusted  $R^2$  by around 4%. Tobin's Q (Q) significantly increases the largest shareholder's ownership at 5% significant level in both specifications. Like its role in the aforementioned firm value model, managerial ownership (MO) is found to have a decrease-increase-decrease cubic relation with the largest shareholder's ownership.

With respect to other ownership control variables, firms controlled by state departments or SOEs (STATE) tend to have higher largest shareholder's ownership, which is strongly related to these firms' advantage of getting loans from banks compared with those firms controlled by private legal persons. The stronger second to the fifth largest shareholders' ownership (TOP5LS) variable negatively affects the ownership of the largest shareholder. Similar to the managerial ownership equation, the inclusion of industry and year dummies makes the significance of independent directors on the board (INDIR) disappear. Auditing firm's comments in the annual report (AUDIT), however, become significant at the 5% level.

Unlike managerial ownership, larger firms (SIZE) tend to have higher ownership of the largest shareholder. This could also be explained by the fact that many PLCs in China are directly owned by the state (departments) or indirectly controlled through its institutions or enterprises, which normally have the advantage of preferential policies to get loans from banks. Nevertheless, the largest shareholder's ownership in firms with higher debt (DAR), higher stock volatility (RISK) and a longer listing history (AGE) tend to be lower. High leverage and stock volatility indicates high financial risk. With a long history of being listed, experienced ultimate controllers of PLCs use complex ultimate controlling structures (mainly pyramid structure in China stock markets) to enlarge the separation between cash flow rights and voting rights.

As for political factors, we find city fiscal revenue per capita (LREVENUE) is positively related to the largest shareholder's ownership at 1% in the full specification. It

is consistent with the conjecture that a richer local government might put less pressure on individual firms. The city's unemployment rate (UNEMPLOY), on the other hand, has significant negative effects on the largest shareholder's ownership. A high unemployment rate means the largest shareholder will have to face higher pressure from local government to assume social responsibilities like reducing local unemployment. Surprisingly, the proportion of SOE workers in city's work force (SOEWORK) fails to show any significant effects.

Finally, the locations of firms do not have significant effects on the largest shareholder's ownership. Industry effects and year dummies also significantly affect firms' largest shareholding at 1% and 10% respectively.

## **5.2.2 Simultaneous Equation Analysis by OLS**

### **5.2.2.1 Endogeneity of Corporate Ownership**

According to the above OLS estimation of single equations, firm value (Q), managerial ownership (MO) and largest shareholder's ownership (LS) are shown to be seemingly jointly determined. However, the above OLS results for single equation analysis can be biased due to the potential endogeneity of ownership variables. Regarding the endogeneity of corporate ownership, Demsetz (1983) theoretically argues that corporate ownership is jointly determined by a firm's external environment, and internal characteristics such as industry affiliation, investment opportunity, growth potential, and asymmetric information. His study finds supports from further researches by Demsetz and Lehn (1985), Kroszner and Sheehan (1999), Himmelberg et al. (1999) and Demsetz and Villalonga (2001) respectively. Endogenous ownership in the firm performance model means the disturbance term  $\varepsilon_i$  not only affects firm performance but reflects factors that cause changes in the ownership variables. If this is the case, the OLS results are no longer consistent and conventional statistic tests are no longer valid. Consequently, this will make it impossible to isolate the influence of corporate ownership variables on firm performance.

In order to examine the exogeneity of managerial ownership and largest shareholder's

ownership, we perform an augmented regression test suggested by Davidson and MacKinnon (1993). We first regress managerial ownership (MO) and largest shareholder's ownership (LS) respectively on all exogenous independent variables in the equation system and store the residuals of two regressions into MO\_residual and LS\_residual respectively. Then we estimate the following two augmented regressions:

$$Q_i = \varphi_0 + \varphi_1 MO_i + \varphi_2 LS_i + \varphi_3 MO\_residual_i + \varphi_4 LS\_residual_i + u_i \quad (5.1)$$

$$\begin{aligned} Q_i = & \alpha_0 + \alpha_1 MO_i + \alpha_2 MO_i^2 + \alpha_3 MO_i^3 + \alpha_4 LS_i + \alpha_5 LS_i^2 + \beta_1 STATE_i + \beta_2 TOP5LS_i + \beta_3 INDIR_i \\ & + \beta_4 LIQUID_i + \beta_5 RISK_i + \beta_6 INTANGIBLE_i + \beta_7 SIZE_i + \beta_8 AGE_i + \beta_9 AUDIT_i + \gamma_1 \sum_{i=1}^2 LOCATION_i \\ & + \gamma_2 \sum_{j=1}^3 YEAR_j + \gamma_3 \sum_{k=1}^{11} INDUSTRY_k + \varphi_5 MO\_residual_i + \varphi_6 LS\_residual_i + \varepsilon_i \end{aligned} \quad (5.2)$$

The result shows  $\varphi_3$  and  $\varphi_4$  in the first equation and  $\varphi_5$  and  $\varphi_6$  in the second equation are all significantly different from zero at 5%, 1%, 10% and 10% respectively, indicating both managerial ownership and largest shareholder's ownership are endogenous in the firm value model. The simultaneity problem between firm value and ownership variables results in inconsistency in the above OLS estimates of ownership firm value relation by single equations. So we use 2SLS method in a simultaneous equation model to tackle this problem.

### 5.2.2.2 Simultaneous Equation Analysis

The simultaneous equation model contains three equations as follows.

$$\begin{aligned} Q_i = & \alpha_{10} + \alpha_{11} MO_i + \alpha_{12} MO_i^2 + \alpha_{13} MO_i^3 + \alpha_{14} LS_i + \alpha_{15} LS_i^2 + \beta_{11} STATE_i + \beta_{12} TOP5LS_i + \beta_{13} INDIR_i \\ & + \beta_{14} LIQUID_i + \beta_{15} RISK_i + \beta_{16} INTANGIBLE_i + \beta_{17} SIZE_i + \beta_{18} AGE_i + \beta_{19} RSOEWORKER_i \\ & + \beta_{110} AUDIT_i + \gamma_{11} \sum_{i=1}^2 LOCATION_i + \gamma_{12} \sum_{j=1}^3 YEAR_j + \gamma_{13} \sum_{k=1}^{11} INDUSTRY_k + \varepsilon_{1i} \end{aligned} \quad (5.3)$$

$$\begin{aligned} MO_i = & \alpha_{20} + \alpha_{24} LS_i + \alpha_{25} LS_i^2 + \alpha_{26} Q_i + \beta_{21} STATE_i + \beta_{22} TOP5LS_i + \beta_{23} INDIR_i \\ & + \beta_{24} LIQUID_i + \beta_{25} RISK_i + \beta_{26} INTANGIBLE_i + \beta_{27} SIZE_i + \beta_{28} AGE_i \\ & + \beta_{210} AUDIT_i + \gamma_{21} \sum_{i=1}^2 LOCATION_i + \gamma_{22} \sum_{j=1}^3 YEAR_j + \gamma_{23} \sum_{k=1}^{11} INDUSTRY_k + \varepsilon_{2i} \end{aligned} \quad (5.4)$$

$$\begin{aligned} LS_i = & \alpha_{30} + \alpha_{31} MO_i + \alpha_{32} MO_i^2 + \alpha_{33} MO_i^3 + \alpha_{36} Q_i + \beta_{30} STATE_i + \beta_{32} TOP5LS_i + \beta_{33} INDIR_i \\ & + \beta_{34} LIQUID_i + \beta_{35} RISK_i + \beta_{36} INTANGIBLE_i + \beta_{37} SIZE_i + \beta_{38} AGE_i + \beta_{39} RSOEWORKER_i \\ & + \beta_{310} AUDIT_i + \beta_{311} RFREVENUE_i + \beta_{312} RUNEMPLOY_i + \gamma_{32} \sum_{j=1}^3 YEAR_j + \gamma_{33} \sum_{k=1}^{11} INDUSTRY_k + \varepsilon_{3i} \end{aligned} \quad (5.5)$$

Since two predetermined variables, city fiscal revenue per capita (LREVENUE) and the city's unemployment rate (UNEMPLOY), are only included in the largest shareholder's ownership equation, both the firm value model and the managerial ownership equation meet the necessary condition of identification. In effect, the firm value model is just identified due to the exclusion of the above two variables and the managerial ownership model is over identified because another political factor SOEWORK is also excluded. For the identification of the largest shareholder's ownership equation, we exclude two location dummies (LOCATIONe and LOCATIONw) due to their insignificant effects on the largest shareholder's ownership. Table 5.4 below provides two-stage least squares (2SLS) estimation of the simultaneous equation system.

**Table 5.4 2SLS Estimation of Ownership and Firm Value Relations**

	<b>Q</b>	<b>MO</b>	<b>LS</b>
INTERCEPT	16.3005 *** (8.28)	10.5495 ** (2.32)	19.36202 ** (1.99)
QHAT		0.6684 *** (2.68)	2.9076 *** (8.59)
MOHAT	1.4208 * (1.75)		-10.5468 *** (-4.72)
MOHAT <sup>2</sup>	-		1.0186 *** (5.23)
MOHAT <sup>3</sup>	-		-0.0196 *** (-5.43)
LSHAT	-0.1564 * (-1.76)	0.0578 ** (2.17)	
LSHAT <sup>2</sup>	0.0002 *** (4.31)	-0.0004 *** (-2.68)	
STATE	-0.1298 * (-1.80)	-0.2352 * (-1.92)	4.6841 *** (5.10)
TOP5LS	0.1512 ** (2.00)	0.0283 * (1.96)	-0.7922 *** (-15.50)
INDIR	-0.0067 (-1.56)	0.0017 (0.64)	-0.0697 * (-1.78)
LIQUID	0.0786 (0.63)	0.0867 (1.13)	-0.8372 (-0.71)
INTANGIBLE	0.1910 (0.70)	-0.3128 * (-1.74)	-18.1601 *** (-5.14)
RISK	0.3431 *** (15.72)	-0.2286 ** (-2.59)	-0.7180 *** (-2.56)
DIVIDEND	-1.2323 * (-1.98)	0.4113 * (1.74)	1.7366 *** (3.52)
DAR	-1.0881 *** (-5.53)	-1.0616 * (-1.75)	-1.1708 (-0.75)
SIZE	-0.8137 *** (-9.56)	-0.5413 ** (-2.48)	1.5838 *** (3.86)
GROWTH	0.0006 (0.44)	0.0016 (1.39)	0.0200 (1.52)
AGE	0.1351 *** (3.44)	0.0618 (1.19)	-1.0594 *** (-4.75)
LOCATIONw	-0.0100 (-0.24)	-0.1087 (-1.37)	-
LOCATIONe	0.2631 * (1.90)	0.2176 * (1.79)	-
SOEWORK	-0.1531 (-1.44)	-	-0.6736 (-0.54)
LREVENUE	-	-	0.0006 *** (4.84)



UNEMPLOY	-	-	-10.5233 *** (-2.58)
AUDITs	2.21 * (0.0506)	0.84 (0.5207)	3.94 *** (0.0014)
DINDUSTRYs	5.46 *** (0.000)	2.07 ** (0.0197)	13.66 *** (0.000)
DYEARS	18.92 *** (0.000)	0.85 (0.4640)	18.50 *** (0.000)
Adjusted R <sup>2</sup>	0.4205	0.0267	0.5123
F test	40.21 *** (0.000)	1.69 *** (0.0073)	101.66 *** (0.000)
Observations	2748	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

The firm value model is shown in the first column. Overall, regressors are jointly significant and have reached a reasonable explanatory power (adjusted R<sup>2</sup> is 42.05%). MOHAT and LSHAT are predicted values of managerial ownership (MO) and the largest shareholder's ownership (LS), which are obtained from the first-stage regressions of managerial ownership equation and the largest shareholder equation respectively. Unlike the OLS single equation, 2SLS estimation fails to detect a cubic relation between managerial ownership (MOHAT) and firm value (Tobin's Q). Instead, only an incentive alignment effect of managerial ownership is found. On the other hand, like single equation analysis, the significance and positive sign of LSHAT<sup>2</sup> suggests that the largest shareholder's ownership affects firm value in a "U"-shaped way, which is inconsistent with our hypothesis of LS: the inverse "U"-shaped effects on firm value. In other words, we fail to detect an incentive alignment effect of the largest shareholders. This nonlinear influence of the largest shareholder's ownership on firm value confirms our conjecture that tunneling by controlling shareholders reaches its most severe level when their ownership is at intermediate level. While too low ownership does not give the largest shareholder enough controlling power, too high ownership means tunneling is carried out at high cash flow cost. Other large shareholders' ownership (TOP5LS) positively affects firm value at the 5% significance level, indicating their monitoring role against agency problems. Nonetheless, independent directors on the board (INDIR) do not seem to serve as an internal effective monitoring force. Similar to the single equation analysis, firms with a state department or a SOE as the largest shareholder (STATE) tend to have lower firm value.

High stock volatility (RISK) is still shown to significantly increase firm value at the 1% level. This finding is consistent with high speculation and high trade turnover ratio in China's stock markets. Despite its positive effects on firm value, intangible assets (INTANGIBLE) have always been insignificant. This might be due to the small proportion of R&D and advertising in PLC's total assets. Although smaller firms (SIZE) tend to be evaluated higher thanks to their less frequent principal-agency problems, firms with a longer history of being listed (AGE) are also expected to have higher firm value due to their sustainability and experience. In addition, leverage (DAR) is found to have significant negative effects on firm value at the 1% level. Surprisingly, despite its significance at 10%, dividend (DIVIDEND) is found to negatively affect firm value. Besides, net profit growth rate (GROWTH) does not significantly increase firm value. This seemingly "strange" finding of dividend and profit suggests given the fact that earning management and profit tunneling by controlling shareholders of PLCs have been epidemic in China's stock markets, investors are rather suspicious of (accidental) high dividends and high growth announcement. Additionally, firms with more free cash flow (LIQUID) are shown to insignificantly have higher firm value. Furthermore, the proportion of SOE workers in a city's total work force (SOEWORK) is shown to have negative but insignificant effects on firm value. Finally, dummy variables of auditing comments, location, year, and industry effects are all jointly significant.

The second column of Table 5.4 reports the 2SLS estimation of the managerial ownership equation. QHAT is the predictor of Tobin's Q obtained from the first-stage firm value regression. First-stage regressions of the firm value model and the largest shareholder's ownership equation show the strong explanatory power that all exogenous variables have in QHAT and LSHAT. In other words, QHAT and LSHAT are good predictors for Q and LS respectively. But in the second stage, we find a rather weak relation (adjusted  $R^2$  equals 2.67%). We find firms with higher value (QHAT) tend to have higher managerial ownership at 1% significance level. The largest shareholder's ownership (LSHAT), however, has an inverse-"U" relation with managerial ownership, which can probably be explained by the predominance of state ownership in China's stock markets. Specifically, initially firms with state departments or SOEs as the largest shareholder (STATE) tend to have lower managerial ownership. As reform of

incorporation proceeds, budget constraints on state-owned legal persons became tightened and regulatory scrutiny from CSRC became increasingly strict. As a result, during the sample years, some state-owned legal person block shares has been sole to private investors so that some PLCs have experienced change of control from the state to private investors. In this privatization process, management buy-outs (MBOs) is one of the methods adopted in 2001-2, after which the enthusiasm has faded away owing to the suspicion of undervaluation of state asset and state asset-stripping. Finally, other large shareholders (TOP5LS) are in favor of increasing managerial ownership to enhance managers' incentive, which is consistent with their objective of deterring agency problems.

In addition, due to their wealth constraints managers of larger firms (SIZE) tend to have lower managerial ownership. But, firms with a longer history of being listed (AGE) are found to have higher managerial ownership. This is because experienced managers need to be awarded so as to behave competently. Interestingly, dividend ratio (DIVIDEND) intangible assets (INTANGIBLE) and stock volatility (RISK) are shown to have positive, negative, and negative effects on managerial ownership respectively, which is of exact opposite directions to their effects on firm value reported in column 1. These differences reflect the problem of information asymmetry between insiders and outside investors in China's stock markets. On the other hand, leverage (DAR) is shown to have negative effects on managerial ownership at 10% significance level. Besides, we also find firms located in eastern areas of China tend to have higher managerial ownership. Nonetheless, similar to the single equation analysis, we also fail to find significance from independent directors on the board (INDIR), free cash flow (LIQUID) and net profit growth (GROWTH). Finally, managerial ownership is significantly affected by the firm's industry affiliation, but not by year dummies.

The 2SLS estimation of the largest shareholder's ownership is reported in the third column of Table 5.4. Overall, the adjusted  $R^2$  reaches over 50%, indicating regressors jointly have significant influence on the largest shareholder's ownership. Individually, we find higher firm value (QHAT) leads to the increases in the largest shareholder's ownership. Surprisingly, we find a cubic relation between managerial ownership (MOHAT) and the largest shareholder's ownership (LS). In other words, as the

managerial ownership increases, the largest shareholder's ownership will first decrease, then increase, and finally decrease. The possible interpretation, if any, lies in the different relations between the largest shareholder and managers of the firm among China's PLCs. Specifically, the largest shareholder of a firm with low managerial ownership does not mind giving up small number of shares to managers to consolidate his control of the firm and reduce managerial agency costs. As for firms with high managerial ownership, the largest shareholder has to increase his shares from other shareholders to deal with MBO (manager buy out) threat to the firm. Firms with stronger insiders where managerial ownership tends to be high, top managers might have the power to increase their shares to take effective control of the firm at the expense of impairing controlling status of the largest shareholder.

In terms of other ownership structure variables, similar to single equation results, firms under state control (STATE) have higher levels of largest shareholder ownership. It is shown that other large shareholders (TOP5LS) tend to object to the increase in the largest shareholder's ownership so as to keep their shares stable and avoid tunneling activities by the controlling shareholder. Noticeably, as another internal monitoring force, a higher proportion of independent directors on the board (INDIR) reduces the incentive of the largest shareholder to increase ownership.

As for control variables, we find intangible assets in total assets (INTANGIBLE) have significant negative effects on the largest shareholder's ownership. A higher ratio of intangible assets to total assets indicates a larger opportunity set for discretionary spending. As a result, a controlling shareholder might not necessarily increase cash flow rights to gain private benefits of control. Similar to managerial ownership, information asymmetry is also reflected by the significantly negative effects of stock volatility (RISK) on the largest shareholder's ownership. Understandably, higher dividends (DIVIDENDS) and net profit growth (GROWTH) enhance the largest shareholders' incentive to increase their ownership, although the latter is not significant. Additionally, larger firms (SIZE) are found to have higher ownership of the largest shareholder, whereas largest shareholders of firms with longer history of being listed (AGE) are not keen to increase their cash flow rights to gain more benefits.

As far as political factors are concerned, firms located in cities with higher fiscal

revenue per capita (LREVENUE) tend to have higher levels of the largest shareholder's ownership. Higher fiscal revenue will reduce the tax pressure on individual PLCs so that the budget constraint for the largest shareholder to increase shareholding is limited and the permission of increasing shares by transference transactions is easier to obtain. On the other hand, the proportion of SOE workers (SOEWORK) and city's unemployment rate (UNEMPLOY) both have negative effects on the largest shareholder's ownership, although the former's effect is insignificant. Since many PLCs are controlled by SOEs, the financial pressures due to a large number of SOE workers impair these SOEs' attempt to increase their shareholding in PLCs. Finally, all dummy variables, including auditing comments, year, and industry effects, are shown to have significant influence on the largest shareholder's ownership.

It should be noted that we have also test multicollinearity in the firm value model (the first column) and the largest shareholder ownership model (the third column). There is no evidence of multicollinearity when we expanding both models with variables entered individually. We only include the final confirmed specification here.

## 5.3 Panel Data Methods Analysis

### 5.3.1 Fixed Effects Model and Random Effects Model

In the previous section, we have identified the endogeneity of managerial ownership and the largest shareholder's ownership in OLS estimations of ownership and firm value relations. To mitigate this simultaneity problem, a simultaneous equation model is estimated by OLS to reveal more consistent relations between corporate ownership and firm value, in which all presumably predetermined observable firm characteristics are used as instrumental variables in the 2SLS estimation to tackle the endogeneity problem. Results of 2SLS estimation show observable firm characteristics significantly affect both firm value and corporate ownership. Following a study by Demsetz (1983), Himmelberg et al. (1999) argue that managerial ownership is endogenously determined by the contracting environment, which can differ across firms in both *observable* and *unobservable* ways. In order to further mitigate the endogeneity problem of managerial

ownership, unobserved firm heterogeneity needs to be controlled for as well. Besides, Lee and Ryu (2003) note that the history of managerial ownership needs to be taken into account since it is regarded as an effective signal to outside investors in an inefficient financial market where is full of asymmetric information. As such, a panel data approach is better suited than the cross-sectional methods that were traditionally adopted by Morck et al. (1988) and McConnell and Servaes (1990) respectively.

The panel data model of the relations between ownership and firm value can be written as follows:

$$y_{it} = D_i' \alpha + X_{it}' \beta + \varepsilon_{it} \quad (5.6)$$

where  $y$  can be Tobin's Q, managerial ownership, or the largest shareholder's ownership.  $D$  is the matrix of firm dummies to capture time-invariant unobserved firm-specific effects, such as firm's organization efficiency, management skill and quality, and firm connections with local authorities.  $X$  is the matrix of observable firm characteristics, including ownership variables and control variables.  $\varepsilon_{it}$  is a white noise error term with the distribution of IID  $(0, \sigma_\varepsilon^2)$ .

Specifically, if  $D_i$  is assumed to be correlated with  $X_{it}$ , fixed effects model can be derived from Eq. 5.6 as follows:

$$y_{it} = X_{it}' \beta + \alpha_i + \varepsilon_{it} \quad (5.7)$$

where  $\alpha_i$  is time-invariant firm effects. The correlation between  $\alpha_i$  and  $X_{it}$  render the OLS estimation inconsistent. On the other hand, if  $D_i$  can be assumed to contain a random element to be uncorrelated with  $X_{it}$ , Eq. 5.6 will change to a random effects model:

$$y_{it} = X_{it}' \beta + \alpha + u_i + \varepsilon_{it} \quad (5.8)$$

where  $u_i$  is a firm-specific random residual term with the distribution of IID  $(0, \sigma_u^2)$ . The last two terms in the Eq. 5.8,  $u_i$  and  $\varepsilon_{it}$ , constitute a compound disturbance.

With different assumptions made on the correlation between unobserved firm heterogeneity and observable explanatory variables, a fixed effects model captures the within-firm variation over the sample period, whereas a random effects model uses both within-effects and between-effects information. In this section, we will use both fixed

effects and random effects model to carry out single equation analysis of the corporate ownership and firm value relation.

### 5.3.2 Single Equation Analysis by Panel Data Models

#### 5.3.2.1 Firm Value Model

Firm value model is estimated by fixed effects model and random effects model and results are presented in column 1 and 2 of Table 5.5 respectively. According to the within  $R^2$ , fixed effects model perform slightly better (52.81%) than that of the random effects model (52.39%), while the between and the overall  $R^2$  of the former (8.08% and 16.63%) are both much lower than those of the latter (37.94% and 41.58%) respectively. Both F tests in fixed effects models to test the joint significance of all the explanatory variables and test joint significance of all firm-specific effects are statistically significant at the 1% level. The Wald test in the random effects model confirms the joint significance of all regressors. The Breusch-Pagan Lagrangian Multiplier test in random effects model rejects the null hypothesis that the variance of the  $u_i$  s equals zero ( $\sigma_u^2 = 0$ ), indicating unobserved firm-specific effects do make a difference in the compound disturbance. However, the two Hausman specification tests show the preference of the fixed effects model to both the random effects model and OLS.

So we focus on the fixed effects estimation. Unlike the OLS estimation of the pooled sample, we find an inverse-“U”-shaped relation between managerial ownership (MO) and firm value (Q), indicating that as managerial shareholding increases, firm value increases first due to the incentive alignment effect and then decreases due to the entrenchment effect. We find incentive alignment effects of the largest shareholder’s ownership (LS) at the 10% significance level, without any non-linear effect detected. This finding is consistent with a positive relation between cash flow rights of the largest shareholder and firm value found by Claessens et al. (2000) in eight East Asia countries. However, it seems not to reflect the case that tunneling controlling shareholders of PLCs is prevalent in China’s stock markets. The reason for this might be that the lack of firms’ ultimate ownership information throughout the *whole* sample period limits the ability of our model

to use the separation between cash flow rights and voting rights to capture the entrenchment effect of controlling shareholders.

**Table 5.5 Panel Data Estimation of Ownership and Firm Value Relation with Q as Dependent Variable**

	<b>FE</b>	<b>RE</b>
INTERCEPT	19.3223 *** (13.29)	16.1348 *** (23.08)
MO	0.3125 ** (2.03)	-0.3828 * (-1.46)
MO <sup>2</sup>	-0.0088 ** (-2.14)	-
MO <sup>3</sup>	-	-
LS	0.0100 * (1.71)	-0.0031 (-0.45)
LS <sup>2</sup>	-	0.0002 ** (2.13)
STATE	-1.0001 ** (-2.39)	-0.0916 ** (-2.23)
TOP5LS	0.0093 * (1.90)	0.0116 *** (3.78)
INDIR	0.0031 (1.61)	0.0021 (1.35)
LIQUID	0.1894 *** (2.70)	0.1807 *** (2.67)
INTANGIBLE	0.6704 * (1.79)	0.2511 (0.87)
RISK	0.2451 *** (19.74)	0.2728 *** (22.87)
DIVIDEND	0.0239 (0.15)	0.0139 (0.09)
DAR	-0.5866 *** (-3.71)	-0.6562 *** (-6.05)
SIZE	-0.6686 *** (-10.31)	-0.6810 *** (-22.96)
GROWTH	-0.0015 (-1.54)	-0.0012 (-1.33)
AGE	-0.3981 *** (-20.51)	0.0599 *** (5.12)
SOEWORK	-0.0890 (-1.10)	-0.1224 * (-1.64)
LOCATIONE	-	0.1735 *** (2.95)
LOCATIONW	-	0.1196 * (1.68)
AUDITs	0.51 (0.7679)	3.53 (0.6191)
DYEARs	16.12 *** (0.000)	49.83 *** (0.000)
DINDUSTRYs	-	19.14 * (0.0586)
within R <sup>2</sup>	0.5281	0.5239
between R <sup>2</sup>	0.0808	0.3794
overall R <sup>2</sup>	0.1663	0.4158
F test	207.59 *** (0.000)	-
F test (all $\alpha_{i,s} = 0$ )	10.65 *** (0.000)	-
Wald test	-	2654.61 *** (0.000)
BP-LM test (Var(u)=0)	-	1134.19 *** (0.000)
Hausman (FE vs. OLS)	327.49 *** (0.000)	-



Hausman (FE vs. RE)	148.70 <sup>***</sup> (0.000)	-
Observations	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

We have also test multicollinearity by expanding both models with variables entered individually. There is no evidence of multicollinearity found. We only include the final confirmed specification here. In terms of other explanatory variables, firm value will increase with the identity change of a firm's largest shareholder from the state or a SOE (STATE) to a private legal person. The positive effects of other large shareholders (TOP5LS) on firm value are significant at the 10% level. The low significance can be explained by the stability of their shares due to the tradability constraints imposed on block holders' shares in China's stock market. Nevertheless, the increase in independent directors on the board (INDIR) does not improve firm value. Besides, the increase in a firm's stock volatility (RISK) tends to improve its value, whereas dividends (DIVIDEND) increase does not seem to have significantly positive effects on firm value. On the other hand, with fast growth prospect and less suffering from agency problems, smaller (SIZE) and younger (AGE) firms are valued at higher value. However, the net profit growth (GROWTH) is still insignificant, as found in the OLS estimation. In addition, leverage (DAR) is of significant negative influence on firm value at the 1% level. In contrast to the OLS estimation on the pooled sample, free cash flow (LIQUID) positively contributes to firm value in both models at the 1% significance level.

### 5.3.2.2 Corporate Ownership Equations

The managerial ownership equation is examined by the fixed effects model and the random effects model and the results are reported in columns 1 and 2 respectively in Table 5.6. Overall, according to  $R^2$  in both models we find rather weak explanatory power for all regressors, despite significant results implied by the F test and the Wald test. However, in both models we fail to detect any significant effects of the largest shareholder's ownership (LS) or Tobin's Q (Q) on managerial ownership. This result is different from the simultaneity relations found in 2SLS estimation using the pooled sample. To explain this, the descriptive finding of low and stable managerial ownership in PLCs listed on China's stock markets might be the answer. The insignificance of firm

value is consistent with the fact that in China's stock markets managerial shareholding incentive plans are in their infancy. The majority of PLCs, especially SOE controlled ones, have very low managerial ownership and slow transitional changes to avoid state asset stripping. Instead, these firms tend to use career promotion as their prior incentive tool to reduce managerial agency cost.

**Table 5.6 Panel Data Estimation of Ownership and Firm Value Relation with Managerial Ownership as Dependent Variable**

	<b>FE</b>	<b>RE</b>
INTERCEPT	4.9686 ** (2.20)	2.8603 *** (3.21)
Q	-0.0360 (-1.09)	-0.0392 (-1.52)
LS	0.0087 (0.99)	0.0054 (1.58)
STATE	-0.0072 (-0.78)	-0.0091 ** (-2.57)
LEGAL	-0.0033 (-0.36)	-0.0066 * (-1.94)
TOP5LS	0.0046 (0.53)	0.0045 (1.26)
INDIR	0.0038 (1.53)	0.0041 * (1.83)
LIQUID	-0.0207 (-0.20)	-0.0163 (-0.17)
INTANGIBLE	-2.1588 *** (-3.87)	-0.6831 * (-1.88)
RISK	0.0188 (0.93)	0.0179 (0.97)
DIVIDEND	0.0628 (0.26)	0.1980 (0.99)
DAR	-0.0160 (-0.07)	-0.0530 (-0.40)
SIZE	-0.2315 ** (-2.33)	-0.1099 *** (-2.88)
GROWTH	-0.0001 (-0.01)	0.0002 (0.11)
AGE	-0.0084 (-0.26)	-0.0218 * (-1.71)
LOCATIONNE	-	-0.0360 (-0.56)
LOCATIONNW	-	-0.0951 (-1.22)
AUDITs	2.05 * (0.0686)	4.29 (0.5085)
DYEARS	1.87 (0.1547)	4.76 (0.1906)
DINDUSTRYs	-	9.44 (0.5811)
within R <sup>2</sup>	0.0185	0.0142
between R <sup>2</sup>	0.0017	0.0300
overall R <sup>2</sup>	0.0041	0.0213
F test	1.82 ** (0.0129)	-
F test (all $\alpha_i = 0$ )	3.00 *** (0.000)	-
Wald test	-	46.65 * (0.0901)
BP-LM test (Var(u)=0)	-	438.87 *** (0.000)
Observations	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

As far as the largest shareholder's ownership is concerned, results of fixed effects model and random effects model are reported in Table 5.7 below. Overall, both models have reasonable levels of  $R^2$ . Both F tests in the fixed effects model and the Wald test in the random effects model confirm the joint significance of all regressors respectively. According to the F test for all  $\alpha_{is} = 0$  in the fixed effects model, unobserved firm effects are jointly significant. Likewise, Breusch and Pagan Lagrangian multiplier test in the random effects model confirms the existence of a random term of unobserved firm specific effects in the compound disturbance. Two Hausman specification tests compare fixed effects model with OLS and with random effects model respectively, and both of them confirm the preference of fixed effects model.

**Table 5.7 Panel Data Estimation of Ownership and Firm Value Relation with Largest Shareholder's Ownership as Dependent Variable**

Variables	FE	RE
INTERCEPT	18.8708 ** (2.16)	19.3670 *** (7.61)
Q	0.1470 * (1.80)	0.2526 *** (2.98)
MO	0.0575 (1.02)	0.0673 (1.17)
STATE	0.2087 * (1.74)	0.3281 *** (3.07)
TOP5LS	-0.8631 *** (-71.78)	-0.8567 *** (-73.15)
INDIR	0.0117 (1.62)	0.0101 (1.39)
LIQUID	-0.2865 (-1.05)	-0.2970 (-1.08)
INTANGIBLE	-3.2697 ** (-2.30)	-4.5544 *** (-2.82)
RISK	-0.0216 (-0.42)	-0.0491 (-0.82)
DIVIDEND	0.4804 (0.78)	0.6348 (0.89)
DAR	-3.2029 *** (-4.75)	-2.6079 *** (-3.95)
SIZE	-1.1056 *** (-3.98)	-0.8681 *** (-3.23)
GROWTH	0.0039 (0.98)	0.0042 (1.06)
AGE	-0.2089 * (-1.95)	-1.3043 *** (-5.90)
SOEWORK	-0.0229 (-0.11)	-0.0195 (-0.10)
LREVENUE	0.0385 (0.51)	0.1128 (0.72)
RUEMPLOY	-0.2475 (-0.15)	-0.4030 (-0.24)
LOCATIONNE	-	1.3646 (1.20)
LOCATIONNW	-	-0.1534 (-0.11)

AUDITs	0.81 (0.5406)	5.69 (0.3374)
DYEARs	5.83 *** (0.0030)	24.18 *** (0.000)
DINDUSTRYs	-	55.39 *** (0.000)
within R <sup>2</sup>	0.7571	0.7558
between R <sup>2</sup>	0.3762	0.4482
overall R <sup>2</sup>	0.3957	0.4647
F test	262.55 *** (0.000)	-
F test (all $\alpha_{i,s} = 0$ )	118.44 *** (0.000)	-
Wald test	-	684.77 *** (0.000)
BP-LM test (Var(u)=0)	-	303.27 *** (0.000)
Hausman (FE vs. OLS)	368.18 *** (0.000)	-
Hausman (FE vs. RE)	182.40 *** (0.000)	-
Observations	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

In both models, we find Tobin's Q has significant positive effects on the largest shareholder's ownership. Managerial ownership, despite its positive effects, is not significant at any statistical significance level in either model. As for other ownership variables, firms with SOE as the largest shareholder (STATE) are more likely to have higher levels of the largest shareholder's ownership. This reflects the predominance of state ownership in China's stock markets, which heavily rely on their easier access to loans from banks. As expected, other large shareholding (TOP5LS) is negatively related to the largest one's ownership at the 1% significance level. Independent directors on the board (INDIR) have no significant influence on the largest shareholder's ownership.

All control variables, except free cash flow (LIQUID), are of expected signs. The insignificance of free cash flow helps us understand that controlling shareholders do not simply depend on increasing their cash flow rights to gain control of firms' resources. Similar to their counterparts in the 2SLS estimation on the pooled sample, higher intangible assets (INTANGIBLE), higher firm leverage (DAR) and higher stock volatility (RISK) tend to reduce the incentive of the largest shareholder to increase his shares, although RISK is insignificant. The largest shareholders in longer listed firms (AGE) are more reluctant to increase their cash flow rights. This might be because their controlling status have already been solidified through all these years. Interestingly, firm size (SIZE)

changes its direction in the pooled sample analysis, from positive to the expected negative sign, indicating it is more difficult for the largest shareholder to increase his ownership as the firm grows larger. On the other hand, net profit growth (GROWTH) is shown to have insignificant positive effects on the largest shareholder's ownership. Besides, we find firms located in eastern (western) areas tend to have higher (lower) levels of largest shareholder's ownership in the random effects model, insignificantly though. Furthermore, local political indicators, local city fiscal revenue per capita (LREVENUE), city unemployment rate (UNEMPLOY) and the proportion of local SOE workers in the work force (SOEWORK), do not seem to have significant influence on the incentive of the firm's largest shareholder to increase shareholding level.

### **5.3.3 Simultaneous Equation Analysis by Panel Data Models**

According to single equation analysis by fixed effects and random effects model, we find firm value and the largest shareholder's ownership are jointly determined. Managerial ownership, however, is shown to have significant effects only on firm value (not the largest shareholder's ownership), not vice versa. Single equation analysis by fixed effects models shows us the fixed effects model is preferable to the random effects model. The fixed effects model mitigates the endogeneity problem by allowing for the correlation between the ownership and unobserved firm-specific effects  $\alpha_i$ s. However, it should be noted that the traditional fixed effects model cannot totally remove the endogeneity caused by the correlation between ownership and error term  $\varepsilon_{it}$  in the model. With instruments, we might be able to further solve the endogeneity problem of the ownership variables.

In this section we first examine the exogeneity of managerial ownership and the largest shareholder's ownership, and then apply fixed effects 2SLS method in a simultaneous equation framework to estimation the corporate ownership and firm value relation.

#### **5.3.3.1 Endogeneity in Fixed Effects Model**

Like the case of OLS, under a panel data framework, we perform an augmented

regression test suggested by Davidson and MacKinnon (1993) to examine the exogeneity of managerial ownership and the largest shareholder's ownership. We first use fixed effects model to regress managerial ownership (MO) and largest shareholder's ownership (LS) respectively on all exogenous independent variables in the equation system. We then store the residuals of two regressions as  $MO\_residual_{it}$  and  $LS\_residual_{it}$  respectively. Corresponding to Eq. 5.1 and Eq. 5.2, we then estimate the following two augmented regressions using fixed effects models:

$$Q_{it} = \varphi_0 + \varphi_1 MO_{it} + \varphi_2 LS_{it} + \varphi_3 MO\_residual_{it} + \varphi_4 LS\_residual_{it} + u_{it} \quad (5.9)$$

$$\begin{aligned} Q_{it} = & \alpha_0 + \alpha_1 MO_{it} + \alpha_2 MO_{it}^2 + \alpha_3 MO_{it}^3 + \alpha_4 LS_{it} + \alpha_5 LS_{it}^2 + \beta_1 STATEOWN_{it} + \beta_2 LEGAL_{it} \\ & + \beta_3 TOP5LS_{it} + \beta_4 AUDIT_{it} + \beta_5 INDIR_{it} + \beta_6 LIQUID_{it} + \beta_7 RISK_{it} + \beta_8 INTANGIBLE_{it} \\ & + \beta_9 SIZE_{it} + \beta_{10} AGE_{it} + \gamma \sum_{i=1}^3 YEAR_{it} + \varphi_5 MO\_residual_{it} + \varphi_6 LS\_residual_{it} + \varepsilon_{it} \end{aligned} \quad (5.10)$$

Different from results by OLS, the results show coefficients for managerial ownership residuals,  $\varphi_3$  and  $\varphi_5$ , are not significant at any conventional level, whereas coefficients for the largest shareholder's ownership,  $\varphi_4$  and  $\varphi_6$ , are significantly different from zero at 1% and 10% respectively. In other words, after allowing for correlation between explanatory variables and unobserved firm heterogeneity and focusing on the within variations, managerial ownership technically becomes exogenous, and only largest shareholder's ownership is found endogenous in the firm value model. Thus we can conclude that under a panel data framework the simultaneity problem mainly exists between firm value and the largest shareholder's ownership. Thus, we use the fixed effects 2SLS method in a simultaneity equation model to tackle this problem.

### 5.3.3.2 Simultaneous Equation by Fixed Effects Model

According to single equation analysis by a fixed effects model, managerial ownership can be treated as an exogenous regressor in fixed effects models. Therefore, the fixed effects simultaneous equation model now contains the following two equations:

$$\begin{aligned} Q_{it} = & \alpha_1 MO_{it} + \alpha_2 MO_{it}^2 + \alpha_3 MO_{it}^3 + \alpha_4 LS_{it} + \alpha_5 LS_{it}^2 + \beta_1 STATE_{it} + \beta_2 TOP5LS_{it} + \beta_3 INDIR_{it} \\ & + \beta_4 LIQUID_{it} + \beta_5 RISK_{it} + \beta_6 INTANGIBLE_{it} + \beta_7 DAR_{it} + \beta_8 SIZE_{it} + \beta_9 AGE_{it} + \beta_{10} GROWTH_{it} \\ & + \beta_{11} DIVIDEND_{it} + \beta_{12} AUDIT_{it} + \gamma \sum_{j=1}^3 YEAR_j + \mu_i + \varepsilon_{it} \end{aligned} \quad (5.11)$$

$$\begin{aligned}
LS_{it} = & \alpha_1 MO_{it} + \alpha_2 MO_{it}^2 + \alpha_{33} MO_{it}^3 + \alpha_6 Q_{it} + \beta_1 STATE_{it} + \beta_2 TOP5LS_{it} + \beta_3 INDIR_{it} + \beta_4 LIQUID_{it} \\
& + \beta_5 RISK_{it} + \beta_6 INTANGIBLE_{it} + \beta_7 DAR_{it} + \beta_8 SIZE_{it} + \beta_9 AGE_{it} + \beta_{10} GROWTH_{it} + \beta_{12} AUDIT_{it} \\
& \beta_{13} SOEWORK_{it} + \beta_{14} LREVENUE_{it} + \beta_{15} UNEMPLOY_{it} + \gamma \sum_{j=1}^3 YEAR_j + \mu_i + \varepsilon_{it}
\end{aligned} \quad (5.12)$$

where  $\mu_i$  is an unobserved firm-specific effect, which is allowed to be correlated with observable firm characteristics. It should be noted that time-invariant variables, such as location and industry effects, are left out of both equations. Given that the dividends issued by PLCs are averagely low and shares held by state and legal persons are only transferrable with the permission of the authorities because of tradability constraints in China's stock markets, the dividend has a closer relation to firm value than the largest shareholder's ownership. On the other hand, political factors are expected to affect the authorities' decision making on the largest shareholder's shares transference. Thus, for identification reasons, Eq. 5.11 excludes three local political indicators (SOEWORK, UNEMPLOY, and LREVENUE), whereas Eq. 5.12 excludes dividend (DIVIDEND). Therefore, Eq. 5.11 is over identified and Eq. 5.12 is just identified.

The first stage of the fixed effects 2SLS estimation is carried out by regressing Tobin's Q and the largest shareholder's ownership on all exogenous variables, including exogenously-treated managerial ownership. In this state, we obtain the predicted values of firm value and the largest shareholder's ownership, QHAT<sub>it</sub> and LSHAT<sub>it</sub>. In the second stage, we regress the firm value model and the largest shareholder's ownership equation with LS<sub>it</sub> in Eq. 5.11 and Q<sub>it</sub> in Eq. 5.12 replaced with LSHAT<sub>it</sub> and QHAT<sub>it</sub> respectively. Estimation results of the firm value equation and the largest shareholder equation are presented in Table 5.8.

**Table 5.8 Two-stage Fixed Effects Estimation of Firm Value and Ownership Equation**

	<b>Q</b>	<b>LS</b>
INTERCEPT	15.1932 *** (9.37)	14.4498 *** (7.18)
QHAT		4.8669 ** (2.25)
LSHAT	0.1576 ** (2.25)	
LSHAT <sup>2</sup>	-0.0010 *** (-2.79)	
MO	0.2532 * (1.79)	-0.0224 (-0.33)
MO <sup>2</sup>	-	-

STATE	-0.3857 *** (-3.01)	0.1074 (1.32)
TOP5LS	0.9087 ** (2.19)	-0.8603 *** (-72.81)
INDIR	0.0025 (0.78)	0.0276 *** (2.99)
LIQUID	0.0786 (0.48)	-0.3362 (-1.17)
INTANGIBLE	0.5633 (0.43)	-2.8712 * (-1.79)
RISK	0.2701 *** (11.48)	1.2172 ** (2.27)
DIVIDEND	-0.4397 (-1.61)	-
DAR	-0.8248 (-0.63)	-2.7805 ** (-1.98)
SIZE	-0.7420 * (-1.70)	-2.7721 * (-1.88)
GROWTH	-0.0019 (-0.79)	-0.0071 (-1.52)
AGE	-0.4235 *** (-2.86)	-2.2433 *** (-2.60)
SOEWORK	-	0.1689 (0.72)
UNEMPLOY	-	4.1832 (1.41)
LREVENUE	-	-0.0437 (-0.77)
AUDITs	1.42 (0.2147)	1.09 (0.3647)
DYEARs	10.23 *** (0.000)	5.69 *** (0.0034)
within R <sup>2</sup>	0.5257	0.7930
between R <sup>2</sup>	0.0763	0.3918
overall R <sup>2</sup>	0.1585	0.4129
F test	191.54 *** (0.000)	385.13 *** (0.000)
F test (all $\mu_i = 0$ )	10.87 *** (0.000)	53.03 *** (0.000)
Hausman (2slsFE vs. FE)	72.80 *** (0.000)	68.76 *** (0.000)
Observations	2748	2748

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

Similar to previously reported tables, multicollinearity of managerial ownership has also been tested by expanding both models with variables entered individually. Likewise, we only report final confirmed model specification here. The first column shows 2SLS fixed effects estimation of the firm value model. Overall, the F test confirms joint significance of all regressors and overall adjusted R<sup>2</sup> reaches 15.70%, which is much smaller than adjusted R<sup>2</sup> obtained from 2SLS estimation of the pooled sample (40.21%). The Hausman specification test compares two-stage fixed effects model with a fixed effects model, and confirms the former is preferred to the latter according to the Hausman  $\chi^2$  statistic (72.80). LSHAT is the predicted value of the largest shareholder's ownership (LS), obtained from the first-stage regression of the largest shareholder equation.



Different from 2SLS on the pooled sample and single equation analysis by panel data models, the largest shareholder's ownership (LSHAT) is shown to have inverse-“U” shaped influence on firm value. This finding supports our empirically derived hypothesis of coexistence and dynamic dominance of the incentive alignment effect and the entrenchment effect of the largest shareholder. This nonlinear influence on firm value suggests as the largest shareholder's ownership increases the firm's value will first increase, but after the largest shareholder's ownership reaches some high level, firm value goes down. In other words, after gaining effective control of the firm the incentive for the largest shareholder to carry out tunneling activities to obtain private benefits becomes intensified. As a result of tunneling, firm value decreases.

On the other hand, we fail to detect a cubic relation between managerial ownership (MO) and firm value. Instead, similar to 2SLS estimation on the pooled sample, only the incentive alignment effect of managerial ownership is found at the 10% significance level. Other large shareholders' ownership (TOP5LS), as always, positively affects firm value thanks to their monitoring role against principal-agency problems. Independent directors on the board (INDIR), however, do not contribute to firm value significantly. Similar to 2SLS analysis on the pooled sample, firms under control of a state department or a SOE (STATE) tend to have lower firm value at 1% significance level, indicating PLCs formed by spin-off assets from SOEs are more likely to suffer from tunneling through various channels.

Most of the control variables are shown to affect firm value consistently with 2SLS estimation on the pooled sample. Smaller firms (SIZE) tend to be evaluated at higher market values because they suffer less from principal-agency problems. High stock volatility (RISK) is still shown to significantly increase firm value at the 1% level, which can be explained by the high speculation and high trade turnover ratio in China's stock markets. Despite its positive effects on firm value, intangible assets (INTANGIBLE) still fail to show any significant influence on firm value. Additionally, an increase in free cash flow (LIQUID) does not improve firm value significantly. The “strange” finding of negative roles of significant dividends (DIVIDEND) and insignificant influence of net profit growth (GROWTH) on firm value reflects market concerns about the source

(origin) and the use of this growth, given that earning management and profit tunneling by controlling shareholders of PLCs have been epidemic in China's stock markets.

In addition, apart from the largest shareholder's ownership, some control variables also change their roles in the firm value model. Firms with a longer history of being listed (AGE) are evaluated with lower firm value. In this case, the market's concern about entrenchment of controlling shareholders prevails over the positive information of firm's sustainability. Besides, surprisingly, there is no statistically significant influence of leverage (DAR) on firm value. The possible explanation might be that with averagely high levels of debts, the marginal effects of debts on firm value reduce. Finally, annual auditing comments become insignificant, which reflect the case that annual auditing comments for most firms are hardly changed during sample years.

The 2SLS estimation of the largest shareholder's ownership is reported in the second column of Table 5.8. Overall, all regressors are jointly significant with the adjusted  $R^2$  just over 40%. Hausman  $\chi^2$  statistic (68.76) is not high, but still confirms the two-stage fixed effects model is preferable to the fixed effects model. Individually, at the 5% significance level, the largest shareholder tends to increase his share holding as firm value (QHAT) increases. Unlike the 2SLS estimation on the pooled sample, where a cubic relation between managerial ownership and the largest shareholder's ownership is found, using a two-stage fixed effects model we only detect insignificant and negative effects of managerial ownership. This finding is consistent with the fact that in China managerial shareholding is on average quite low (0.017%). Because of the suspicion on MBOs (Management buy-outs) of state assets undervaluation and stripping, only dozens of PLCs have managed to implement MBOs in 2001-2. Overall, the influence of managers and the threat of MBO are marginal, let alone the development of managerial shareholding in state controlled PLCs where it is a more sensitive issue and heavily relies on the government's policies.

Among other ownership structure variables, the identity dummy of state as the largest shareholder (STATE) does not significantly affect the largest shareholder ownership. It should be realized that tradability constraints imposed on state and legal person shares further solidify the ultimate predominance of state ownership as a whole. As a result, we would not expect this identity dummy to change frequently during sample years. On the

other hand, other large shareholders (TOP5LS) object to the expansion of the largest shareholder's ownership since their large volume of shares guarantee their voting rights to avoid tunneling activities by the controlling shareholder.

Noticeably, there are changes in effects of several other independent variables on the largest shareholder's ownership. First, independent directors on the board (INDIR) do not significantly reduce the incentive of the largest shareholder to increase ownership. Second, the significance of intangible assets in total assets (INTANGIBLE) has declined to the 10% level. But its negative sign still indicates the largest shareholder might use intangible assets as a substitute channel to increasing cash flow rights to gain benefits. Third, debt level (DAR) significantly reduces the incentive of the largest shareholder to increase shareholding at the 1% level. Clearly, a high debt level matters more to block shareholders than to atomistic outside investors. Fourth, as a firm gets larger (SIZE), the largest shareholder faces more difficulty in increasing his shares. Fifth, annual comments from auditing firms become insignificant, which consistently reflects the practical relation between auditing firms and their PLC customers which are directly controlled by the largest shareholders.

Changes also take place to directions of three political factors, which are all insignificant. Surprisingly, we find increase in fiscal revenue per capita (LREVENUE) of the city where the firm is located tend to reduce the incentive of the largest shareholder to increase his shareholding, whereas an increase in the proportion of SOE workers (SOEWORK) and city's unemployment rate (UNEMPLOY) have the opposite effects. This is exactly the opposite to the cross-sectional 2SLS estimation on the pooled sample. In other words, when we purely focus on within-variations using a fixed effects model, higher fiscal revenue per capita might mean local officials face more pressure to keep up the high standard, while a higher proportion of SOE workers and the city's unemployment rate put up more pressure on local officials to "persuade" SOE controlled PLCs not to privatize (reduce) their shares. Therefore the attitude and actual influence of local officials to SOE controlled PLCs and privately controlled ones are rather different. It is certain that firms controlled by private entities will change the overstaffing situation by laying-off many employees, which will intensify social issues that cannot simply be paid off by the one-shot proceeds generated from privatization process.

Other control variables have the same effects on the largest shareholder's ownership. We find significantly negative effects of stock volatility (RISK), which support our conjecture of the information asymmetry between the market and inside large shareholders. Besides, net profit growth (GROWTH) boosts largest shareholder's incentive to increase his ownership, but still in an insignificant way. Additionally, as a firm is listed longer (AGE), the largest shareholder is more reluctant to increase his cash flow rights because he has built up the experience of controlling the firm to gain private benefits through various channels. Furthermore, free cash flow (LIQUID) has negative effects, though insignificantly, on the largest shareholder's ownership. When more free cash becomes available in a firm, the largest shareholder of the firm does not necessarily increase his cash flow rights to obtain more private benefits of control. Instead, he can fulfill this objective by associated transactions based on non-market prices or investing in associated companies where he has higher cash flow rights. Finally, year dummy variables have significant influence on the largest shareholder's ownership.

## 5.4 Ownership-Control Separation and Firm Value

In previous sections we examine the relation between firm value and the largest shareholders who *directly* controls listed firms and find their nonlinear effects on firm value. Liu and Sun (2005) argue that the state *ultimately* predominates the markets *directly* through its departments at various levels and *indirectly* through state-owned legal persons (institutions). Pyramid controlling structure is the most pervasive ultimate controlling structure. Since 2001, CSRC has required listed companies to disclose the information on their ultimate controllers. However, this information has not been properly provided by most PLCs because most PLCs simply reported their largest shareholder's information. For our sample period between 2001 and 2004, information on ultimate controllers of PLCs is only available for 2004 from our data source. In this section, by using the same package of controlling variables as in the above firm value model we use this data to cross-sectionally examine how the separation between cash

flow rights and voting rights affects firm value. The OLS estimation result is reported in Table 5.9.

**Table 5.9 OLS Estimation of Relation between Ownership-and-Control Separation and Firm Value**

	(1)	(2)	(3)
INTERCEPT	9.9666 *** (10.52)	10.2669 *** (10.85)	10.3095 *** (10.89)
V/C	-0.0265 ** (-2.05)	-0.0327 *** (-2.65)	-0.0569 * (-1.78)
(V/C) <sup>2</sup>	-	-	0.0012 (0.98)
STATEU	0.1677 *** (2.67)	0.1015 (1.59)	0.0855 (1.26)
TOP5LS	0.0049 ** (2.43)	0.0034 * (1.70)	0.0036 * (1.77)
INDIR	0.0164 (1.49)	0.0169 (1.53)	0.0168 (1.52)
LIQUID	0.4674 *** (4.78)	0.4027 *** (3.69)	0.4020 *** (3.72)
INTANGIBLE	0.0340 (0.16)	-0.6501 (-1.09)	-0.6493 (-1.09)
RISK	0.2585 *** (7.18)	0.2620 *** (7.56)	0.2620 *** (7.58)
DIVIDEND	1.0465 *** (4.33)	0.9714 *** (4.02)	0.9659 *** (4.00)
DAR	1.9589 *** (5.13)	1.9483 *** (5.21)	1.9478 *** (5.21)
SIZE	-0.4972 *** (-11.25)	-0.5133 *** (-11.97)	-0.5131 *** (-11.97)
LOCATIONw	-0.0701 (-1.10)	-0.0754 (-1.17)	-0.0752 (-1.17)
LOCATIONe	0.1519 *** (2.63)	0.1588 *** (2.81)	0.1612 *** (2.85)
DINDUSTRYs	-	5.81 *** (0.000)	5.79 *** (0.000)
Adjusted R <sup>2</sup>	0.7580	0.7909	0.7910
F test	21.14 *** (0.000)	15.49 *** (0.000)	15.13 *** (0.000)
Observations	1149	1149	1149

**Note:** t statistics are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

Overall, in all three specifications, we find fairly high values of adjusted R<sup>2</sup>. The inclusion of industry dummies improves the explanatory power of regressors. The separation between voting rights and cash flow rights, measured by the ratio of voting rights to cash flow rights (V/C), is significant at the 1% level in the first two models and at 10% in the third model, where the square term of the ratio of voting rights and cash flow rights, (V/C)<sup>2</sup>, is added but fails to show any significance. In the specification 2, by performing an augmented regression to examine the exogeneity of V/C, we fail to find the statistical significance of V/C\_residual in the augmented regression, indicating the exogeneity of V/C.

The negative signs of V/C suggest that firms with a larger discrepancy between cash flow rights and voting rights tend to have lower firm value (Tobin's Q). This finding provides supportive evidence from China's listed companies for the results found by Claessens et al. (2000) in other East Asia countries. In other words, the cash flow rights of the ultimate controller in the PLC have a positive relation to firm value (the incentive alignment effect), whereas the voting rights of the ultimate controller in the PLC is negatively related to firm value (the entrenchment effect). Analogical to the largest shareholders who directly control the PLC, ultimate controllers also have incentive alignment effects and entrenchment effects. Noticeably, while the two effects of the former is embodied by the nonlinear effects of the largest shareholder's ownership on firm value, as shown in the above sections, the two effects of the latter are reflected by the cash flow rights and the voting rights of the ultimate controller.

The effects of other ownership variables and control variables do not seem to change much compared with our OLS estimation on the whole pooled sample.

## 5.5 Evidence of Tunneling

Estimation results are presented in Table 5.10. We estimate tunneling by a static pooled probit, a dynamic pooled probit, a traditional random effects probit, and dynamic random effects probit model respectively.

**Table 5.10 Estimation of Tunneling by Dynamic Random Effects Probit Model**

Independent Variables	Pooled (Static)	Pooled (Dynamic)	Random Effects Probit	DREP
INTERCEPT	-1.3845 ** (-2.51)	-2.1079 ** (-2.41)	-2.0428 ** (-2.32)	-1.5992 * (-1.87)
TUNNEL <sub>t-1</sub>		1.4574 *** (19.47)	1.4081 *** (16.03)	1.0275 *** (3.87)
DIVIDEND <sub>t-1</sub>	-0.7602 *** (-2.81)	-0.5922 ** (-2.04)	-0.6143 ** (-2.00)	-0.2208 * (-1.73)
ROA <sub>t-1</sub>	2.1687 *** (3.55)	1.0477 * (1.70)	1.1631 ** (1.95)	1.9624 *** (2.94)
AUDIT <sub>t-1</sub>	0.1567 (1.44)	0.1008 (0.87)	0.1160 (0.71)	0.2530 (1.08)
DAR <sub>t-1</sub>	0.3965 *** (3.52)	0.4003 *** (2.56)	0.5135 *** (2.67)	0.3557 ** (1.93)

LS	0.0362 (0.22)	0.0458 (0.39)	0.0496 (0.43)	0.0020 (0.19)
STATE	1.0622 (1.23)	0.1053 (1.61)	0.1049 (1.54)	0.0710 (0.60)
TOP5LS	0.0019 (0.72)	0.0012 (0.45)	0.0010 (0.32)	0.0098 (1.38)
INDIR	-0.0188 (-0.25)	-0.0580 (-0.53)	-0.0519 (-0.57)	0.0863 (0.54)
AGE	0.0450 *** (4.10)	0.0334 *** (2.68)	0.0363 *** (2.76)	0.0184 * (1.90)
SIZE	0.0587 (1.02)	0.0334 (0.60)	0.0382 (0.61)	0.1901 ** (2.31)
LOCATIONNE	0.0612 (0.89)	0.0462 (0.62)	0.0481 (0.61)	0.0937 (0.58)
LOCATIONNW	0.2805 *** (3.24)	0.2111 ** (2.24)	0.2237 ** (2.23)	0.4018 ** (2.03)
UNEMPLOY	-0.5463 (-0.50)	-0.5433 (-0.48)	-0.5818 (-0.48)	-0.3268 (-0.31)
DEFICIT	0.0701 ** (2.10)	0.0347 (0.96)	0.0362 (0.96)	0.0298 (0.80)
DYEAR02	-0.1429 * (-1.79)	-0.0569 (-0.70)	-0.0567 (-0.70)	-0.0486 (-0.62)
DYEAR03	-0.3454 *** (-4.00)	-0.2499 *** (-2.81)	-0.2602 *** (-2.80)	-0.2272 *** (-2.57)
DYEAR04	-0.4110 *** (-4.81)	-0.2499 *** (-2.51)	-0.2531 *** (-2.56)	-0.2148 *** (-2.70)
DINDUSTRY	included	included	included	included
Observations	2914	2914	2914	2914
Wald (Chi)	N/A	N/A	556.47 *** (0.000)	92.48 *** (0.000)
Pseudo R <sup>2</sup>	0.0693	0.2285	N/A	N/A

**Note:** Z values are in the parentheses for coefficients. P values are in the parentheses for tests. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% confidence levels (two tailed) respectively.

As we can see from the column 3 and 4, both dynamic models confirm that there is a significant persistence ( $TUNNEL_{it-1}$ ) in tunneling decisions among the sample years at the 1% level. The remarkable increase in pseudo R square from the static pooled probit in column 2 to the dynamic pooled probit in column 3 confirms the importance of tunneling activity in the previous year. The static pooled probit model, however, unreasonably ignores this indispensable dynamic factor and overstates the influence of all year dummies and some industry dummies on tunneling. The dynamic pooled probit model and the standard random effects probit model, on the other hand, reach similar results and both overestimate the state dependence at over 140 per cent respectively, compared with 100 per cent in the dynamic random effects probit model. Notably, both a dynamic pooled probit model and the traditional random effects probit model give rise to the endogeneity problem due to the correlation between the lagged dependent variable and

the error term. As such, we now focus on the results estimated from the dynamic random effects probit model.

Apart from the indispensable tunneling in the previous year, all four models confirm significantly negative for the dividend in the pervious year ( $DIVIDEND_{t-1}$ ) in tunneling decision making. The dividend can be regarded as a part of tunneling opportunity cost. In other words, if the dividend is expected to be high, projected from its previous level, the controlling shareholder will be more reluctant to forgo high dividend to pursue private benefits. From another perspective, higher levels of previous dividends will draw more attention from investors and financial institutions, which will generate pressure against tunneling behavior. On the other hand, higher return on assets in the previous year ( $ROA_{t-1}$ ) make tunneling more possible in the current year in all four models. This finding also explains why when making the tunneling decision, the controlling shareholder might tend to ignore the reserved part of profit that is used for maintenance and future investment. Another lagged regressor, the external auditing comments in the previous year ( $AUDIT_{t-1}$ ) fails to show any significant deterrent role in tunneling. Each year only small numbers of PLCs are given “non-standard comments” because of substantial abnormal incidents taking place, which does not reflect the epidemic of tunneling in China’s markets.

Noticeably, the largest shareholder ownership only has insignificantly positive effects on tunneling. According to the ultimate ownership theory (La Porta et al, 1999), this might be due to the discrepancy between the cash flow rights and voting rights. Unfortunately, due to the availability of ultimate ownership, our tunneling model is unable to testify this conjecture. Also, there is no evidence showing that PLCs with state or state agents as their controlling shareholder tend to significantly suffer from tunneling problem, with a positive relation between their having a state identity (STATE) and tunneling.

As far as internal monitoring forces are concerned, we find no significant negative effects of the second to the fifth largest shareholders (TOP5LS) in deterring tunneling. This finding suggests from a corporate governance perspective that the predominance of the largest shareholder on the board might be the fundamental reason for tunneling. Moreover, independent directors on the board (INDIR) turns out not to have significant influence in deterring against the tunneling either. Surprisingly, unlike the first three models, we find a positive role independent directors played in tunneling. As we



mentioned before, the objectiveness of independent directors' opinion might be distorted by the power of the controlling shareholder, whose opinion can affect the board's decision of nominating, electing, and replacing independent directors.

In terms of controlling variables, results from dynamic random effects probit model show that firms with larger scale of assets (SIZE), higher debt in the previous term ( $DAR_{t-1}$ ), and longer history of being listed (AGE) are more likely to suffer from tunneling by their controlling shareholders. In other words, larger PLCs in China's stock market might have more associated firms, and lacking transparency and higher agency costs will overshadow their presumably more advanced monitoring and management system. This finding also explains why some PLCs suffer from problems of heavy debts and tunneling at the same time. After all, debt holders, unlike equity creditors, cannot get much control of the listed company once a fixed repayment schedule is provided to meet their claims of debts. Controlling shareholders of longer listed firms can build up political and economic connections and become more entrenched so as to pursue the private benefits of control.

All four models confirm that firms located in western areas of China are more likely to be tunneled by their controlling shareholders. Specifically, PLCs' public shares are traded in SHSE and SZSE and minority investors scatter all over the nation. It is understood that people in eastern areas are richer and make up more minority investors of PLCs in China, so that these people as a whole are expected to be more sensitive to tunneling (expropriation of minority investors) and in turn show more deterrent effects against tunneling. Besides, the lower level of transparency and less efficient legal enforcement and administration can also make it easier for tunneling to take place in western areas in China.

Year dummies from 2002 to 2004 have more and more significantly negative effects on tunneling, showing that macro policies launched during these sample years have been gradually stricter and more effective in deterring tunneling. However, political factors from local governments do not significantly deter tunneling. While the unemployment rate (UNEMPLOY) has negative effects on tunneling, the positive relation between tunneling occurrence and fiscal revenue per capita (DEFICIT) confirms the tax evasion nature of tunneling.

Finally, some industries including heavy industries like coal mining and electricity generation and gas, and quality-oriented industries like food manufacture and the medical industry, tend to suffer more from tunneling problem at significance levels of 5%, 5%, 5% and 10% respectively. Heavy industries are mostly capital intensive ones and have complicated production processes. As a result, there are many transactions between associated companies, which give rise to opportunities for controlling shareholders to tunnel. Food manufacture industry and medical industry, on the other hand, can only solve their core problems like product quality and safety control through reinvesting in the production system. Tunneling by controlling shareholders obviously has significant negative effects on such maintenance and investment activities of PLCs. Our finding of different extents of tunneling problem suffered from by different industries suggests that authority policies sometimes need to be made in a more specialized way so as to capture different characteristics of tunneling behaviors from different industries.

## 5.6 Conclusion

There are several empirical findings from the study. We find firm value, managerial ownership and the largest shareholder's ownership are jointly determined under a cross-sectional framework of simultaneous equation analysis. While managerial ownership is shown to have monotonically positive effects on firm value, the largest shareholder's ownership has a "U" shaped influence on firm value. However, when taking into account unobserved firm-specific effects under a panel data framework, we only find firm value and the largest shareholder's ownership are jointly determined, although managerial ownership still affecting firm value in a linearly positive way. In other words, we only find the endogeneity of the largest shareholder using panel data models. Firm value has positive effects on the largest shareholder's ownership, while the largest shareholder ownership is found to have an inverse-"U" shape influence on firm value, indicating the empirical dynamic dominance between the incentive alignment effect and the entrenchment effect. Furthermore, to further allow for ultimate ownership in the relation, we use cross-sectional data and find the separation between cash flow rights and voting

rights is negatively related to firm value. This proves the coexistence of the incentive alignment effect (embodied by cash flow rights) and the entrenchment effect (embodied by voting rights).

In terms of other factors affecting firm value, the second to the fifth largest shareholders are shown to positively contribute to firm value. Nonetheless, we fail to detect any significant roles of independent directors on the board and external auditing comments in improving firm value. Firms controlled directly by the state and indirectly controlled state-owned institutions are found to have lower firm value. We also find larger and longer listing firms have lower firm value. However, debt level does not show any significant effects on firm value. High speculation is found to dominate the China's stock markets, because of the significant role of risk taking among outside investors.

On the other hand, the largest shareholder's ownership is found to be positively but insignificantly related to the local proportion of SOE workers and local unemployment. The second to the fifth largest shareholders significantly object to the increase in the largest shareholder's shares. It is more difficult for the largest shareholders of larger and longer listed firms to increase their shareholding. According to the significant negative roles of intangible assets and debt level we find the largest shareholder tend to be more rational to increase his shares.

We explore the occurrence mechanism of the largest shareholder's tunneling and find that firms that suffered from tunneling in the past tend to have the same problem in the current year. In other words, tunneling of the largest shareholder is rather persistent. Firms with a longer listing history and higher debt levels are more likely to suffer from tunneling problems. Firms located in western area of China are more likely to be tunneled by their controlling shareholders. We find central government policy against such behavior has become increasingly effective. This is signaled by the significant negative role of year dummies. From local authorities' perspectives, however, we only find an insignificant negative role for the local unemployment rate. The local fiscal deficit is positively related to tunneling occurrence, reflecting the tax evasion nature of tunneling.

# Chapter 6

## Conclusion

### 6.1 Conclusion

Recent studies on corporate governance show that globally concentrated ownership is more pervasive than the widely dispersed ownership under which managerial principal-agency problems can easily arise. The expropriation of minority shareholders by controlling shareholders gives rise to another type of agency problem between controlling shareholders and minority shareholders. However, existing researches on the relation between corporate ownership and firm value have just focused on either managerial principal-agency problems or the controlling shareholder's expropriation agency problem, leaving the interaction between these two problems unexplored. Another issue with these studies on ownership-and-firm value relations is their way of handling the endogeneity of corporate ownership. They either simply use cross-sectional estimation methods without tackling the endogeneity problem, or try to use instrumental variables to solve the problem in OLS or panel data models, without taking into account simultaneity between ownership and firm value.

In this study of China's listed companies, we apply a 2SLS fixed effects model in a simultaneous equation system to study the interaction among firm value (Tobin's Q), managerial ownership, and the largest shareholder's ownership, controlling for two sources of endogeneity: unobserved firm heterogeneity and the simultaneity problem. We find all three variables are jointly determined under a cross-sectional framework of simultaneous equation analysis. However, when taking into account unobserved firm-specific effects under a panel data framework, we find that only firm value and the largest shareholder's ownership are jointly determined, although managerial ownership still affects firm value in a linearly positive way. In other words, we only find the endogeneity of the largest shareholder in panel data models. Firm value has positive effects on the largest shareholder's ownership, while the largest shareholder ownership is found to have an inverse-"U" shape influence on firm value. To further allow for ultimate ownership in

the relation, we use cross-sectional data and find the separation between cash flow rights and voting rights is negatively related to firm value. This proves the coexistence of the incentive alignment effect (embodied by cash flow rights) and the entrenchment effect (embodied by voting rights).

The nonlinear influence of the largest shareholder's ownership on firm value calls attention to the expropriation of minority shareholders through various types of tunneling behavior. By using a dynamic random effect probit model to allow for unobserved firm heterogeneity, dynamic factors and endogeneity of initial conditions, we explore the occurrence mechanism of the largest shareholder's tunneling. We find tunneling of the largest shareholder is rather persistent in the sense that firms that suffered from tunneling in the previous period tend to have the same problem in the current year. Firms with longer listing histories and higher debt levels are more likely to suffer from tunneling problems. Firms located in western areas of China are more likely to be tunneled by their controlling shareholders. We find government policy against such behavior becomes increasingly effective, according to the significant negative role of year dummies. From local authorities' perspective, however, we only find an insignificant negative role for the local unemployment rate. On the other hand, the local fiscal deficit is positively related to tunneling occurrence, reflecting the tax evasion nature of tunneling.

## 6.2 Policy Insights

There are some policy insights that can be drawn from our studies. First, although we find larger managerial shareholding does lead to higher firm value, failing to detect the reverse causality between these two aspects suggests in China managerial shareholding is not used as a main incentive tool to encourage improvement in managers' performance. On average, managerial ownership is rather low and only changes slowly across time unless substantial changes in ownership structure take place. In effect, in many cases, managerial ownership is a legacy of SOEs partial privatization process that took place in a particular period of time. Instead, currently managers in China's PLCs are mainly driven by their compensation package (annual payment and bonus), which lacks flexibility and only has limited influence on the firm's sustainable development over the

years. Our study suggests PLCs should relate managerial shareholding to firm performance so as to use it as a fundamental incentive tool to improve firm value.

Second, we also provide evidence that at high levels of ownership, the largest shareholders become more entrenched and carry out tunneling activities to pursue private benefits, rather than maximize firm value. However, in China's PLCs the largest shareholders normally dominate the firm's board, so that the monitoring and deterrent roles of other large shareholders against non-value-maximizing decisions are quite limited. This suggests authorities should launch policies to regulate board composition and the appointment of senior managers. Besides, independent directors on the board are not playing effectively independent role either, indicating the appointment of independent directors should not be mainly under the control of the largest shareholder. If necessary, the bonus independent directors obtained from the PLC should be reconsidered to be issued from a state agency or a market entity that is independent of the PLC. Furthermore, although tunneling is quite epidemic in China's stock markets, annual comments from auditing firms do not reflect this. In each year, only a minority of PLCs have a "non-standard comments" indicating substantial incidents taking place in the year. Thus, law and regulations against collusion between auditing firms and PLCs should be introduced, so that auditing firms should bear more economic and indeed even legal responsibility if they fail to detect potential problems underlying PLCs, and reflect this crucial information in auditing reports in time. Finally, in order to protect interests of minority investors in a more effective way, CSRC (China Securities Regulatory Commission) should lower the limit on shareholding percentage for minority shareholders to collectively raise extraordinary motions in shareholder meetings of PLCs.

From the supervision perspective, another suggestion can be made according to our study. In order to improve the transparency of stock markets, supervision entities (not just official legal departments) should be given the right to directly obtain the PLC's controlling shareholder's financial information relating to the PLC. Once solid evidence of tunneling is found, there should be penalties directly applicable to the "tunneler", not just staffs of the PLC involved in tunneling or the PLC itself. Besides, atomistic investors should be given rights to sue the controlling shareholder to protect themselves against the expropriation of minority shareholders. Finally, "Politically correct" should not be a valid

excuse for SOE controllers, or even for local governments, if used to justify the expropriation of minority investors. There should be some policies against local political interference into local courts' decisions of local PLCs, although this situation cannot be thoroughly eliminated.

State controlled listed companies, directly or indirectly, are shown to have lower firm value than ones that are controlled by private legal persons. Insignificantly we also find a positive relation between the presence of state as the controlling shareholder and the occurrence of tunneling. This suggests the legacy of PLCs' "carve-out" formation is still affecting their performance. Therefore cooperation between CSRC (China Securities Regulatory Commission) and SASAC (State-owned Assets Supervision and Administration Commission) has to be improved in order to effectively regulate large state-controlled listed firms.

Last but not least, the location and political affiliation of PLCs are shown to have effects on firm value and the possibility of tunneling. Firms located in western areas of China have lower firm value but a higher possibility of tunneling problems. This suggests western areas suffer more from lack firm transparency and effective corporate governance than other areas of China. On the other hand, the local unemployment rate and fiscal deficit of these areas are not necessarily higher than those of eastern industrial areas, so that local governments are not expected to exert more pressure on, or provide stricter supervision for PLCs. Thus local governments should not only implement uniform central government policies, but should develop their own effective methods to further improve the quality of both local PLCs and local supervision.

### **6.3 Future Research**

With respects to future research on the topic, more information of ultimate ownership in China's listed companies needs to be collected and used in the study. Besides, this study only provides evidence from China's listed companies that are just a small part of China's economies. Studies on larger samples including unlisted companies are expected to depict a more inclusive picture of the relation between firm value and corporate ownership.

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